U.S. DEPARTMENT OF AGRICULTURE

FARMERS' BULLETIN

572

Rev.ed. follows

Contribution from the Bureau of Plant Industry, Wm. A. Taylor, Chief.
(In Cooperation with the Department of Farm Management, New York State College of Agriculture.)

March 4, 1914.

A SYSTEM OF FARM COST ACCOUNTING.

By C. E. LADD, *Agent, Office of Farm Management.*

INTRODUCTION.[1]

The farmer wishes to know how much he is making or losing on his business each year, how much he is making or losing on each crop or class of animals, and how he can improve his business so as to make more money. Cost accounting for the farm is the same sort of work which the large meat-packing companies are doing to learn whether they make a profit on canned goods, smoked meats, etc. The farmer wishes to know whether his wheat pays and whether his cows or orchard pay. These are some of the things which a set of farm cost accounts will show.

Many farmers are desirous of keeping accounts of this sort, but do not know how to start. Undoubtedly many are deterred from starting because they believe that they do not know enough about bookkeeping and because they have in mind no definite method of procedure. To any such men who desire to keep accounts and who have not worked out a system for themselves, it is believed that the system outlined in this paper will be helpful. Those who are already keeping accounts but are not satisfied with the results obtained may find here some suggestions of value.

Farm cost accounting, of necessity, involves many estimates, but there is no reason why one should lose faith or be discouraged because of them. If the worker has reasonably good judgment and is not prejudiced in favor of any crop or animal he can obtain satisfactory results. The systems of cost accounting in use by the large packing companies and by large wholesale grocery houses involve as many

[1] This system of farm cost accounting was developed by Prof. G. F. Warren, of the New York State College of Agriculture, on his own farm, where it has been in use for seven years. The principles of it are published in his book entitled "Farm Management." This system has been given a thorough trial for three years with a number of farmers under the immediate supervision of the writer of this bulletin, working jointly for the United States Department of Agriculture and the New York State College of Agriculture.

estimates and do not give any more accurate results than do well-kept farmers' accounts.

Cost accounts can not be absolutely exact. They contain many estimates. It is foolish to spend time with the refinements in methods of bookkeeping that are designed to check exact work to the last cent. In fact, attempts to find insignificant errors often disgust persons with the whole question of accounting.

Of the desirability of keeping accounts on a farm much has been said in the agricultural press. In an agricultural survey of Tompkins County, N. Y., made in 1907, it was found that 45 per cent of the farmers already keep some sort of records or accounts.

This bulletin simply aims to give a description of a system of farm cost accounting which has been tried for three years in the State of New York with 53 farmers under widely differing conditions and has proved fairly successful. It is a method so simple that a farmer can keep it without assistance.

TIME REQUIRED TO KEEP ACCOUNTS.

The first question which the practical farmer asks about a set of accounts is, "How much time will it take?" The time required is one of the chief objections made to most kinds of farm cost accounting. The farmers who have used this particular system during the past year answer the question of time by estimates ranging from two to ten minutes a day. The average seems to be about five minutes for the daily entries. To this must be added a number of hours of work at the end of the year to close the accounts. This time will vary with the type of farming, the complexity of the business, and the degree of accuracy and completeness with which the accounts have been kept.

BOOKKEEPING KNOWLEDGE UNNECESSARY.

No bookkeeping knowledge is necessary. In all the cooperative work done so far, bookkeeping training, as sometimes given in commercial schools, has seemed a detriment rather than a help. Those trained in commercial bookkeeping have a tendency to insert technicalities and complexity of entry which would be all right for a business house, but which are entirely out of place for a practical farmer who wishes to do cost accounting. It is not necessary to know the difference between a daybook and a journal or to know how to get a trial balance in order to keep good farm cost accounts.

A FAVORABLE TIME TO START ACCOUNTS.

Accounts may be started on an ordinary farm any time after the last crop is harvested in the fall and before the first crop preparations are started in the spring. The exact date will depend upon the geographical location of the farm and the nature of the business or type

of farming in practice. The time should be as late as possible, in order that there may be the smallest quantity of last year's crops on hand to be inventoried. However, the date should be early enough to give the farmer sufficient time to close his year's accounts, work out results, plan the next year's business, and start new accounts before the spring crop work begins. In a large majority of cases this date will be January 1, March 1, or April 1. For a tenant the date for taking an inventory will, of course, correspond to the date of his lease.

REQUIREMENTS FOR KEEPING A COMPLETE SET OF FARM COST ACCOUNTS.

In order to have a complete set of farm accounts three records are necessary:

(1) An inventory at the beginning and at the end of the year.
(2) An account of all money paid out or received.
(3) A record of all work done by men and horses during the year.

INVENTORY.

The inventory on an ordinary farm is a matter requiring from two to five hours' work at the beginning and at the end of the year. The same inventory, of course, is used for closing one year's accounts and starting the next, so that this work is done only once a year. This inventory should be a detailed list, with values, of the following: The farm, subdivided into buildings and land, each building being listed separately, with the number of acres of land and its value per acre (the total value of buildings and land listed being equal to the value of the farm); the horses, listed by name and giving their ages, followed by other live stock listed separately, giving value per head; machinery, each item being listed separately, except that small tools may be bunched as one item; quantities of feed, produce, and supplies on hand; growing crops (value of labor and materials already spent for next year's crops); cash on hand and in bank; and bills receivable. The total of all these should be found and the mortgage and bills payable, if any, subtracted from it. The difference is what the farmer is worth above debts, or his present net worth.

In estimating values, the market price at the farm, or the price at the selling place minus the cost of hauling to market, should always be the standard.[1] The value put upon anything should be what it is thought can be obtained for it at a normal sale and should neither be overrated nor underrated. In either case, one is fooling only one's self. It is better to be fair and unprejudiced and use one's best judgment.

[1] A more complete discussion of this problem of determining values and depreciation is given in Farmers' Bulletin 511, entitled "Farm Bookkeeping," pp. 12-15.

TABLE I.—*A sample summary of an inventory.*[1]

Item.	Mar. 1, 1912.	Mar. 1, 1913.
Farm, 200 acres (including buildings)	$8,000	$8,000
Cows:		
20 head at $60	1,200	
15 head at $70		1,050
Horses, 6	900	850
Machinery	783	800
Feed and supplies	1,100	850
Growing crops (cost of labor and materials)	110	125
Cash	97	437
Bills receivable	75	95
Total resources	12,265	12,207
Mortgages and bills payable	3,125	2,300
Net worth	9,140	9,907
Gain for the year	767	
	9,907	9,907

[1] In the complete inventory each cow, horse, and machine is listed separately.

The form in Table I is presented here as a suggestion as to the way in which the inventory may be classified and summarized after two inventories are completed.

If preferred, the inventories may be kept on pages by themselves in the financial record book and the entering of inventory values to the individual accounts may be deferred until both inventories are complete and the accounts are being closed at the end of the year. The method of entering these amounts is given under "Closing the accounts at the end of the year."

No other account will give so much information for the time and labor expended as the annual inventory. By comparing the net worth as shown by the current inventory with the net worth shown by that of the previous year, the farmer can tell whether he has made a gain or loss and how much, after paying from farm receipts what he has expended for the living expenses of the family.

If money has been added to or taken from the business by gifts or by transfer from some other business that is not included in the inventory, these items would have to be known in order to tell the gain or loss. Usually the farmer lists all his property in the inventory, so that there is no chance for such an error. He may have only a small amount of cash on hand, as the gain may all be invested in a new team, additional cows, or extra feed. On the other hand, the cash on hand may be much larger than the year before, thus making the farmer feel more prosperous, whereas the number of head of stock or the quantity of feed on hand may be so much less that he has actually farmed at a loss that year.

The annual inventory shows the annual gain or loss on the farm business, but it does not show what crops or what animals have made a gain or loss. On nearly every farm where accounts have been kept,

the gain or loss for the year resulted from losses on several accounts and gains on several accounts. In every case the farmer was much surprised to see which accounts showed a gain and which a loss. Results like these can only be shown by a complete system of accounts.

FINANCIAL RECORD.

A record of the receipts and expenditures on the farm is necessary for a complete set of accounts. For this purpose a book called by stationers a "broad daybook," or "journal," is used. The requirements are that there be a place for a date on the left-hand side of the page, a broad space in the middle of the page in which to write explanations, and columns ruled for dollars and cents at the right. The page is ruled and items are entered as shown in the sample account with potatoes in Table II. The financial record book at the end of the year becomes the completed account book and will have a summary of labor entered in it from the work record as described later.

A separate account is kept with real estate, each crop grown, each class of animals, machinery, labor, interest, persons dealt with, bills payable and bills receivable, and with such other items as may be found necessary or convenient.

The items that make up bills payable and bills receivable should be listed in the inventory at the end of the year, as mentioned, either from memoranda or in any other way which may be found convenient. In closing out the inventory at the end of the year, the items for which money is due or owing should be charged or credited to their respective accounts. When these bills are settled, during the early part of the following year, the entries should be made under bills payable or bills receivable, as the case may be.

In this book two pages facing each other are taken for each account. The name of the account is written at the top of the page. The right-hand page is marked "Credits" and is used only to record credits to the account. The left-hand page is marked "Charges" and is used only for charges against the account. The pages then appear as shown in the sample account with a crop of potatoes (Table II).

TABLE II.—*A sample account with potatoes in a 14-acre field.*[1]

Charges.			Credits.		
1913.	Item.	Amount.	1913.	Item.	Amount.
June 3	Seed, 160 bushels, at 45 cents	$72.00	Oct. 5	Sold, 226 bushels, at 60.18 cents	$136.00
4	Corrosive sublimate, 3 ounces	.30	20	Sold, 510 bushels, at 62 cents	316.20
10	Seed, 43¾ bushels, at 55 cents	24.06	Nov. 1	Sold, 241 bushels, at $1.083	261.02
11	Corrosive sublimate, 6 ounces	.60		Saved for seed, 135 bushels, at $1	135.00
July 12	Paris green, 6 pounds	1.32		Saved for home use, 16 bushels, at 60 cents	9.60
15	Lead arsenate, 160 pounds	14.40		Residual manure, 60 per cent of 1911	18.00
	Use of land, 5 per cent on $100 per acre	70.00		Residual manure, 30 per cent of 1910	6.00
	Man labor, 796 hours, at 19.02 cents	151.40			
	Horse labor, 839 hours, at 10.46 cents	87.76			
	Equipment labor, 839 hours, at 3.5 cents	29.36			
	Manure, 60 per cent of 1910 application	12.00			
	Manure, 100 per cent of 1911 application	30.00			
	Total charges	493.20			
	Gain	388.62			
	Grand total	881.82		Total credits	881.82

[1] In the account book the items for "Charges" will occupy the entire left-hand page, and those for "Credits" the entire right-hand page.

Now, suppose that on a trip to town on June 1 one spends $1.40 for horseshoeing, $3 for fencing, $5 for cow feed, and receives a $65 check for 6,500 pounds of milk. The entries are made as follows: The account marked "Horses" is turned to and on the left-hand page is entered "June 1—Shoeing, $1.40." The "Real estate" account is turned to and on the left-hand page is entered, "June 1—Fencing bought, $3." The "Cows" account is turned to and on the left-hand page is entered, "June 1—Cow feed bought, $5." On the right-hand page, under this same account, is credited, "June 1—Milk, 6,500 pounds, $65."

These entries are now complete; they will never have to be posted or entered again in any way. It is often advisable to keep a memorandum book in the pocket in which to make notes when money is paid out in town, so that the items will not be forgotten before they can be entered in the account book.

Whenever money is paid out, the farmer turns to the account in the book to which this money should be charged and enters it on the left-hand page. Whenever money is received the amount is credited to the proper account by entering it on the right-hand page under that heading. These are the only entries made. The amounts are charged or credited directly to the accounts to which they belong.

To find the account wanted is made much easier by indexing the books in the following manner: Take a piece of adhesive tape about 1½ inches long, bend it double, and stick it on the edge of the page in such a manner that it projects about one-half inch. On this pro-

jection write the name of the account kept on that page. Put a piece of tape on each account, arranging them one below the other along the edge of the book so that all can be seen at the same time. Tabs suitable for this purpose can be purchased from most stationers.

WORK RECORD.

For the work record, a book ruled exactly like the financial record book, except that there should be two double columns at the right of the page, may be used. This should be indexed in the manner already described. In this book no separate pages are used for charges and credits and no entries are made in terms of dollars and cents. In the first double column at the right-hand side of the page are entered man hours and minutes, and in the second are written horse hours and minutes. These headings should be placed at the top of each column, so that the page appears as shown in Table III. This book contains simply a record of the work done on the farm during the year, classified according to the enterprise for which it was done, and it also gives the date and number of hours of each operation.

The sample record with wheat shown as Table III will serve to illustrate the way the items should appear in the work record.

TABLE III.—*A sample work record with wheat.*

1912.	Operation.	Man.		Horse.[1]	
		Hours.	Minutes.	Hours.	Minutes.
Aug. 2	Plowing oats stubble	8	30	17	
	Rolling	1	45	3	30

[1] Horse hours are expressed in terms of one horse for one hour. Hours of horse labor should not be charged against the horse account.

Suppose that the date is May 1. The work done on this day aside from chores was drilling in oats 6 hours, with 2 horses; plowing for corn 8 hours, with 3 horses; repairing plow, 2 hours of man labor alone. The entries are made as follows: The "Oats" account is turned to, "May 1" written in the left-hand column, the single word "Drilling" written in the broad space in the middle of the page, and the figure "6" entered under man hours. Since 2 horses were used for 6 hours, the figure "12" should be entered under horse hours. In the same way, on turning to the "Corn" account, "May 1—Plowing, 8 [under man hours], 24 [under horse hours]" is entered. Turning to the "Machinery" account "May 1—Repairing plow, 2 [under man hours]" is entered. When this is done, the work entry for the day is complete; it will never have to be posted or written again. The original entry is the only entry made.

For chores a special page should be ruled for each month, as shown in Table IV.

TABLE IV.—*A sample heading for a page of an account book showing the special ruling required for entering chores.*[1]

1913.	Horses.		Cows.		Poultry.		Hogs.	
	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.
May 1	2	20	4	15	.....	30	1	10
2								
3								
4								
etc								

[1] If horses are used in the chore work, extra columns must be ruled under each heading to provide a place for the entry of hours and minutes of horse labor.

It is more accurate to enter the chores every day; but, if chore time is fairly uniform each day, so that the chore work for the entire month can be based on fewer entries, an entry at the beginning, at the middle, and at the end of the month will ordinarily be sufficient. Entries should be made at other times if the time spent on chores changes; for instance, when the cows are turned to pasture, when additional cows freshen, or when a change of feed is made which will require more time or less time for chore work.

DAILY WORK NECESSARY TO KEEP A COMPLETE SET OF ACCOUNTS.

The daily work of keeping a complete set of accounts ordinarily consists in entering receipts and expenses for that day and recording the hours of work done. On many days there are no cash receipts or expenses, as these are likely to be bunched on the days when trips are made to town. An actual day's entry made by one of the cooperators was as follows:

1912.	Item.	Man hours.	Horse hours.	
July 5	Cultivating corn	6	12	
	Cutting hay	4	8	
	Unloading hay	1	1	
	Eggs, 35 dozen at 22 cents			$7.70
	Pulverizer repaired			.75
	Fork bought			.60

The entry of these items with the filling of the chore blanks for that day, if necessary, should not take more than five minutes. It is being done in less than an average of five minutes every day by 51 New York farmers, whose education varies from that acquired in a district school to that of the college graduate, all of whom are working every day in the field with their hired men.

CLASSIFICATION OF FARM PRODUCTS AND FEED.

Entries of the value of all home-grown feeds consumed must be made in the live-stock accounts. All the feed bought is charged in the financial record book directly against the animals for which it was bought. If the hog feed were to run out some day and a bag of cow feed were taken to the hogs, the entries should be made in the financial record book just as if the cows had sold this feed and the hogs had bought it.

At the time of thrashing or at the close of haying the total crop may be entered as a memorandum on the credit side of the proper crop account, but the figures are not yet to be carried to the money column. Estimates can be made with fair accuracy by measuring bins and haymows or by counting the loads drawn and estimating the average weight. The values will be entered when the product is sold or transferred to the animals. When these crops are fed out, an estimate must be made of the proportion fed to cows, horses, and other stock and these accounts charged with the values thereof, credit being given the crops. The quantity sold will be known from weighing bills or otherwise, and it should be credited as a cash receipt.

Whenever grain or hay is fed from the same bin or mow to two or more classes of animals, a day's ration for each class of animals may be weighed or measured once a month or oftener and the proper proportion of the total feed, based on these weighings and the number of days fed, charged to each class of stock. This method will give a reasonable degree of accuracy if weights are taken fairly often. When cows and horses are fed from separate haymows, there will be no difficulty in keeping the feed separate. Where concentrates are purchased in large quantities and fed to several classes of animals, a record may be kept in the feed room of the number of sacks fed to each class of animals.

CLASSIFICATION OF TROUBLESOME ITEMS.

The entry of some items will be confusing to the beginner. Generally common sense will straighten him out if he will ask himself "What account really deserves this credit?" or "What account really deserves this charge?"

The real estate and the machinery accounts usually puzzle the beginner in keeping farm records. The former is more or less of a general account in this financial book and work record. All items for fencing, ditching, improvements, repair of buildings, removal of old fences, new buildings, taxes, and insurance should be charged to this account. Many of these are somewhat permanent and are charges which the landlord ordinarily pays on farms leased on share rental. This account should be credited with any receipts from

land rented out, old buildings sold, stone sold, and other similar items. If any special improvement is made, such as when a line of tile is laid, a building put up, or a silo built, one may open a separate account with it, if so desired. When complete, the cost should be figured and this amount charged against the real-estate account as an improvement.

Against the machinery account all costs of repairs to machinery and tools, all harness items, and the purchase of new implements or tools should be charged. This account should be credited with all receipts from sales of old machinery or machinery rented to neighbors. Under the work on machinery will be entered "Getting new plow points," "Repairing roller," "Storing away machinery," "Making new whiffletrees," and other similar items.

Such work as manuring may be charged against the crop to which it is applied, or an account may be kept with manure and the total cost of manure, including the cost of hauling, may be distributed to the different crops at the end of the year.

In this system no account is kept with "General expense." Nearly all items of this kind can be distributed as they occur. For instance, if a telephone is kept for the purpose of directing the hired man, the expense is charged direct to the labor account. If the telephone is kept for personal and general farm use, it may be charged partly to the personal and partly to the real-estate account. Such items as postage stamps, if small, may be charged to the farm account, but if a large number are used for one enterprise some of the purchases may be charged to this one enterprise.

It is nearly always possible to scatter the charges to different accounts as they occur. A general-expense account, if found to be necessary, should be kept very small.

MISCELLANEOUS NOTES.

There are many miscellaneous notes which it is desirable to keep in the same books with the accounts. Following are some of the entries which have been inserted by farmers and which are especially handy for later use. Sometimes they are merely written on the page where they seem to belong; at other times they are kept by themselves in the back of the book: Date of "last killing frost in spring;" date of "first killing frost in fall;" date of "death of [horse or cow];" "height of hay [or ensilage]" at a certain date.

Other miscellaneous records may be kept, such as herd records, maps of ditches, and maps of the farm, showing the crops for each year. These are not necessary in connection with the cost accounting, but may be kept if the farmer desires, and they will often prove useful.

CLOSING THE ACCOUNTS AT THE END OF THE YEAR.

Considerable time is required to close the set of accounts. However, this figuring should come in the winter at a time when other work is usually slack and when the weather is more favorable for working indoors than out. A definite order should be adhered to in closing the accounts. This order may be as follows:

(1) The first step is to take a final inventory in the same manner as at the beginning of the year. This inventory should include all bills that other persons owe the farmer and all bills which the farmer owes to other persons.

(2) The list of bills payable should be inspected and any items that have not yet been charged should be charged to the proper accounts. For instance, if $15 for labor is still due the hired man at the date of closing, this item should be entered as a charge against labor.

(3) The list of bills receivable should be inspected, and any items that have not yet been credited should be credited to the proper accounts. For instance, if the creamery owes the farmer $65 for milk and a neighbor owes him for some feed, the $65 should be entered as a credit to the cow account and the feed item entered as a credit to the account from which the feed was originally taken.

(4) The record of all feed transferred to the live stock should be completed, charging the various animals and crediting the various crops. Produce raised and fed is charged against the animals at what it is worth on the farm. Suppose, for instance, there were 80 acres of hay with a total yield of 120 tons (20 tons of which had been sold and a credit entered) and that the feed-disposal memorandum showed 60 tons fed to the cows and 15 tons fed to the horses, leaving 25 tons on hand. If hay is worth $12 per ton at the barn, the hay should be credited by entering on the right-hand page of the hay account "60 tons to cows @ $12=$720; 15 tons to horses @ $12=$180." Now, charges against the cows "60 tons of hay @ $12" and against the horses "15 tons @ $12" should be made. When the value of the hay on hand, 25 tons at $12, as shown in the record inventory, is entered as a credit to the hay account, the credits to this account will be complete.

(5) The various classes of live stock should be credited with the portion of unused feeds which were charged to them at the time of purchase or harvest. These farm items will, of course, appear in the second inventory under the group headed "Feeds, produce, and supplies."

(6) The use of pasture should be credited directly to the real estate or to a pasture account and charged against the animals using it. The amount charged for pasture should be as nearly as possible the market price; that is, the price for which pasture rents in that region.

(7) The value of produce used in the house, if not noted before, should be entered. The proper crops or animals should be credited and charges made against the personal account. This item includes estimates of the quantities of milk, eggs, potatoes, and other products used by the family.

(8) The entry of value of board, produce, or other allowances furnished to the laborers should be completed. These charges should be made against labor and the proper accounts credited.

(9) The value of unpaid labor, such as work by the farmer himself, by boys in the family to whom regular wages are not paid, and milking or other farm work by women of the family should be entered. Make these charges against labor and credit the personal account.

(10) The animals should be credited with the value of the manure produced and this amount charged against the crops to which it was applied. The valuation of the

manure should be made at about the market price at the farm. To find the quantity produced, a record should be kept of the number of loads hauled to the fields.

(11) The proper amounts for the use of the buildings by crops, animals, the farmer, or laborers, should be entered. Each crop, each class of animals, the personal account, and the labor account should be charged with its proper proportion and credit of the real-estate account. As a general rule, 8 to 10 per cent of the current value of the buildings may be charged as rent. The proportion of the whole sum which each class of animals or each crop should pay will have to be determined by the farmer in proportion to the amount and value of the space occupied by each. Charges for the use of the buildings on one farm were made as follows:

[Value of barns, $2,000; use for one year at 10 per cent, $200.]

Account to be charged.	Percentage of $200.	Amount.	Account to be charged.	Percentage of $200.	Amount.
Cows	30	$60.00	Horses	20	$40.00
Hay	20	40.00	Corn	5	10.00
Oats	10	20.00			
Machinery	10	20.00	Total	100	200.00
Hogs	5	10.00			

(12) Taxes and insurance paid on personal property should be distributed to the proper accounts. All land taxes are charged to the real estate account and distributed as part of the "Use of land and buildings."

(13) All the hours and minutes of man labor on each enterprise, including the chores, should be added up, these totals being brought together and the sum of the man hours on all enterprises found.

(14) The total cost of man labor for the year should be found.

(15) The rate per hour should be found by dividing the total cost of man labor by the total hours of man labor.

(16) The total number of hours found against each enterprise in the work record should be transferred to the same accounts in the financial record, multiplying each total by the rate to obtain the cost. These items should be credited to labor in the financial record book. When this is completed, the labor account should balance within a few dollars, though if the rate per hour were carried out in full to the last decimal place the account would balance. A difference of 1 mill in the rate for 6,000 hours would make a difference of $6 in the final results, and a difference of one-tenth of a mill would make a difference of 60 cents. This difference or error is not important enough to consider. It may be carried to the "Loss and gain" account, or it may be added to or subtracted from one of the larger items of labor, in accordance with whether it is a loss or a gain.

(17) All the hours and minutes of horse labor spent on each enterprise, including any horse labor on chores, should be added up, these totals being brought together and the sum of the horse hours on all enterprises found, just as was done for man labor.

(18) To find the total cost of horse labor, first the horse inventories should be entered, the first inventory as a charge and the second as a credit to the horses. Then the horses should be charged with interest on the average of the two inventories at the current rate in the section and the interest account credited. The ordinary rate charged in most parts of the United States is 5 or 6 per cent on the investment.

(19) The sum of each side of the horse account should be found. The sum of the credits should be subtracted from the sum of the charges and the difference will be the net cost of horse labor for the year. No charge is made against horses for the use of the harness and other horse equipment, all these costs being charged against the various enterprises in the machinery charge, as hereafter explained, on the basis of horse hours.

(20) The rate per hour of horse labor should be found by dividing the total cost by the total hours. The figure thus obtained is the rate per hour.

(21) The total number of horse hours found against each enterprise in the work record should be transferred to the same accounts in the financial record, multiplying each total by the rate to obtain the cost. These items should be credited to the horse account in the financial record book. When this is completed, the horse account should balance within a few dollars. The reason for the failure to balance is the same as that already given for man labor. To make the account balance, the difference can be added to or subtracted from one of the larger items or carried to the "Loss and gain" account, as stated in paragraph 16.

(22) To find the use cost of the machinery, the first machinery inventory should be entered as a charge and the second as a credit to the machinery account, then this account should be charged with interest on the average of the two inventories, as directed for the horse account. The interest account should be credited with the amount of this interest.

(23) The sum of each side of the machinery account should be found and the credit total subtracted from the charge total, the same as for the horse account. The difference is the total use cost of the machinery for the year.

(24) In order to distribute this cost, it may be assumed that for every hour horses were worked machinery was also used. Then each account will have charged against it the same number of machinery hours as horse hours. To find the rate of cost per machinery hour, the horse hours already charged to machinery should be first subtracted from the total hours of horse labor and the total cost of machinery use divided by this difference. Now the use of machinery for the year should be charged in the same way that the use of horses was charged, except the charge against machinery. When this is complete, the machinery account should balance within a few dollars. The difference may be treated as explained in paragraph 16.

(25) Any other accounts of convenience, such as those for fertilizer or manure, if kept, should be distributed.

(26) All the remaining items should be entered in the inventories. The inventory values for the beginning of the year should be entered on the left-hand page of the separate accounts as a charge; that is, the cow inventory should be entered on the left-hand page of the cow account, the hog inventory on the left-hand page of the hog account, and the others distributed in the same manner. The final inventory for the year is likewise distributed to the separate accounts, but the items are entered on their respective right-hand pages.

(27) The interest, based on the average inventories against all accounts not already charged, should be charged and the interest account credited with the total, using the same rate as that used in charging interest against the horse and machinery account.

(28) The proper charge for the use of the land should be entered. The rate should be high enough so that, with the use of buildings as charged in paragraph 11, it will cover interest on the investment in land and buildings, taxes on real estate, and repairs to buildings and fences, for these items were charged to the real-estate account. Each crop should be charged for the land it occupied and the real-estate account credited.

(29) Both sides of the accounts not yet closed should be footed up. The lesser total should be subtracted from the greater in each account. If the charge side is greater the difference represents a loss, and if the credit side be greater, a gain. The sample potato account given in Table II (p. 6) will illustrate a completed crop account.

(30) A list of the losses and gains should be made and the total of each found in order to show the net gain or loss on the whole business.

(31) Each account and the business as a whole should be studied in order to learn how to improve it.

STUDY AND INTERPRETATION OF RESULTS.

Farm accounts are of little use unless studied and conclusions drawn which will enable one to make his business more profitable in the future. It is just as important to study the different items of cost and returns in an account as it is to know whether or not it pays. From such a study it is often possible to learn how to reduce the cost of production or increase the returns so as to make a losing enterprise pay and to make a profitable one more profitable. In studying the results of a year's business, one must keep constantly in mind that these are the results of a single year. Weather conditions, crop conditions, market conditions for the year as compared with an average year, must be considered. For instance, potatoes in 1912 showed large losses on many farms because of the low prices and the quantities lost by rot. However, by studying the potato account to find the cost of producing an acre, then, by considering both an average yield and price for the locality, one could draw the conclusion that ordinarily it would or would not be a profitable business to raise potatoes on most of the farms where potatoes are raised.

The potato account in Table II (p. 6) was studied when it was closed, and the following facts were obtained: Total acreage, 14; total yield, 1,128 bushels; yield per acre, 80.6 bushels; total cost of crop, $469.20; cost per acre, $33.51; total value of crop, $857.82; value per acre, $61.27; total profit, $388.62; profit per acre, $27.76; man hours per acre, 57; horse hours per acre, 60; labor cost per acre, $10.81; horse labor cost per acre, $6.27; cost per bushel, 41.6 cents; profit per bushel, 34.4 cents. The average value per bushel was higher than is ordinarily received for market potatoes.

Besides the satisfaction of actually knowing what crops or enterprises paid and how much, there are many other ways in which the accounts may be useful. They may be used to study the seasonal distribution of labor on the farm as a whole and on separate enterprises, and also to determine what crops and what animals are the most profitable. By comparing one's results with the facts detailed in bulletins on the same subject, one can find how his efforts compare with those of other farmers as to economy of labor, the working efficiency of horses, and many other points.

By keeping farm cost accounts one can not help but gain an idea of the value of labor. He soon finds that time represents money and that it is equally as important to save one as the other. He sees that it is just as important to save an hour's work by man and team on an acre of oats as it is to get a yield of an extra bushel per acre and that it is more wasteful to have a team idle than to have one man idle for the same length of time.

Farm cost accounts will help to teach one that very often the largest yields may not pay. After closing the accounts the farmer usually gets many surprises. Often he finds that the enterprises which he thinks are the best and to which he devotes most of his time are being conducted at a loss, while the steadier, more common enterprises or crops may be the only ones that show profits.

The system of farm cost accounting outlined in the foregoing pages is not a theoretical system, but one which for several years, with many types of farming and under widely differing conditions, has given satisfaction. It is hoped that what has been written will furnish helpful suggestions to farmers who are keeping accounts and are not satisfied with the results obtained from their present system, and that it will be a guide to be followed by many others who wish to keep accounts but have not known how to make a beginning.

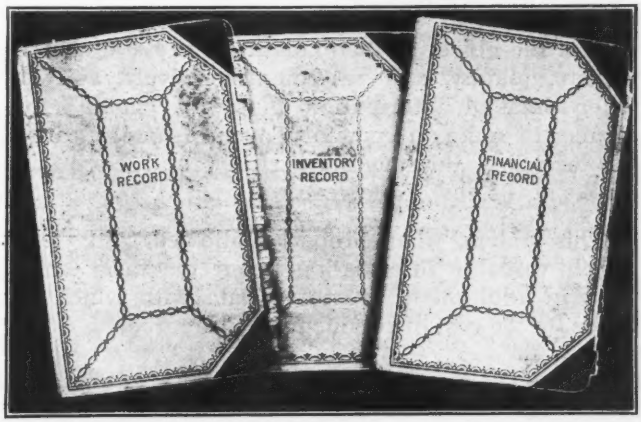
WASHINGTON : GOVERNMENT PRINTING OFFICE : 1914

A SYSTEM OF FARM COST ACCOUNTING

C. E. LADD, Agent

Revised by

JAMES S. BALL
Assistant in Farm Accounting



FARMERS' BULLETIN 572
UNITED STATES DEPARTMENT OF AGRICULTURE

Contribution from the Office of Farm Management
H. C. TAYLOR, Chief

Washington, D. C. Issued March, 1914; revised March, 1920

WASHINGTON : GOVERNMENT PRINTING OFFICE : 1926

THE INCREASED interest in cost of production of farm products has stimulated the demand for systems of farm cost accounting, and especially for a system that is simple in application and planned to give the farmer the information he requires without going into the complexity of detail involved in a highly technical system.

It is the object of this bulletin to explain such a system, plainly, and yet comprehensively, and to offer detailed information that will enable any farmer to make an inventory, open his books, carry his accounts through successfully, and close his books at the end of the year.

This system, when properly followed, will yield much valuable information about the farm business in addition to providing data with which to estimate the cost of production.

Contribution from the Office of Farm Management
H. C. TAYLOR, Chief

Washington, D. C.

Issued March, 1914
Revised March, 1920

A SYSTEM OF FARM COST ACCOUNTING

C. E. LADD, *Agent*
Revised by JAMES S. BALL, *Assistant in Farm Accounting*

CONTENTS

	Page.		Page.
Time required to keep accounts	4	Work record	13
Bookkeeping knowledge unnecessary	5	Classification of troublesome items	15
A favorable time to start accounts	5	Supplementary notes	16
Requirements for keeping farm cost accounts	6	Opening the book at the beginning of the year	16
Inventory record	6	Closing the accounts at end of year	16
Financial, feed, and crop record	9	Study and interpretation of results	20

THE BUSINESS FARMER wishes to know how much he is making or losing on his business each year, how much he is making or losing on each crop or class of animals, and how he can improve his business so as to make more money. The function of farm-cost accounting is to supply this information. Cost accounting for the farm is the same sort of work large manufacturing companies do to learn whether they are making a profit on their different products. The farmer wants to know whether his wheat pays, whether his cows pay, or his orchard. These are some of the questions a set of farm cost accounts will settle.

Many farmers are desirous of keeping accounts of this sort but do not know how to start. Undoubtedly many are deterred from starting because they believe they do not know enough about bookkeeping and because they have in mind no definite method of procedure. To any such men who desire to keep accounts and who have not worked out a system for themselves, it is believed that the system outlined in this bulletin will be helpful. Those who are already keeping accounts but are not satisfied with the results obtained may find here some suggestions of value.

NOTE.—This System of Farm Cost Accounting was developed by Prof. G. F. Warren, of the New York State College of Agriculture, on his own farm, where it has been used for 12 years. The principles of the system are outlined in his book entitled, "Farm Management." It has been given a thorough trial for 8 years with a number of farmers under the immediate supervision of Mr. Ladd and others, working jointly for the U. S. Department of Agriculture and the New York College of Agriculture, and has given excellent satisfaction and valuable results.

152115°—Bull. 572—20——1

No cost accounting can be absolutely exact. Commercial cost accounting and farm cost accounting are alike in this respect. Both are based partly on estimates and partly on ascertainable facts, and both approach exactitude in proportion to the accuracy of these estimates. It is therefore important to make the most accurate estimates possible rather than be satisfied with rough approximations. As the work is carried on year by year and experience is gained, greater accuracy in estimating is attained, with correspondingly greater accuracy in the results of the cost accounts.

On the other hand it is not wise to spend much time with refinements in methods of bookkeeping that are designed to check to the last cent. In fact, attempts to find insignificant errors often disgust inexperienced persons with the whole question of accounting.

Of the desirability of keeping records on a farm much has been written in the agricultural press. In an agricultural survey of Tompkins County, N. Y., made in 1907, it was found that 45 per cent of the farmers already kept some sort of records and accounts, and the proportion has undoubtedly increased since that time.

This bulletin aims to give a description of a system of farm accounting which has been tried for eight years in the State of New York with a number of farmers under widely differing conditions and has proved fairly successful. It is aimed herein to outline the practical working of the system in sufficient detail so that any one who wishes may start it without further aid. It is a method simple enough, when the necessary complexity of any cost accounting is considered, and many farmers should be able to keep the accounts without assistance.

This is a "direct-entry" system, in that there are no preliminary books in which the original entries are to be made and from which they are to the "posted" or copied to the permanent accounts. This feature, which would be a serious fault in commercial accounting, where a hired bookkeeper is employed, as it would be impossible to check or audit the records, is a valuable one for the farmer who keeps his own books, in that it does away with that great bugbear, "posting," resulting in the saving of much time. It is, however, often advisable in busy seasons, when time will not permit the entries to be made each day, to keep a pocket memorandum book in which to make notes from day to day so that nothing is forgotten or overlooked.

TIME REQUIRED TO KEEP ACCOUNTS

The first question the practical farmer asks about a proposed set of accounts is "How much time will it take?" The time required is one of the chief objections made to farm cost accounting, but farmers who have used this particular system during the past eight years answer the question of time by estimates ranging from two to ten

minutes per day. The average seems to be about five minutes for the daily entries. To this must be added a number of hours' work, or perhaps a day or two, at the end of the year to close the year's accounts and open the books for the new year. This time will vary with the type of farming, the complexity of the business, and the degree of accuracy and completeness with which the accounts have been kept.

The daily work of keeping this set of accounts ordinarily consists in entering the receipts and expenditures for the day and recording the hours of work done. On many days there are no cash receipts and expenditures, as these are likely to be bunched on the days when trips are made to town. As a sample an actual day's entries made by one farmer is given as follows:

1918.	Items.	Man hours.	Horse hours.
July 23.	Cultivating corn	5	10
	Cutting hay	3	6
	Making hay	2	2
	Sold eggs, 5 dozen at 45 cents		$2.25
	Paid veterinary for visit to horse	$3.00	
	Paid extra hand, 5 days at $3	15.00	

The entry of these items to the proper accounts, with the filling of the chore blanks, if necessary, should not take more than five minutes. It is being done in less than an average of five minutes per day by a number of New York farmers whose education varies from that acquired at a district school to that of the college graduate, all of whom are working every day in the field with their hired men.

BOOKKEEPING KNOWLEDGE UNNECESSARY

No bookkeeping knowledge is necessary for the successful keeping of this system. In the work done so far, bookkeeping training, as sometimes given in commercial schools, has seemed in some instances rather a detriment than a help, although this training aids in grasping accounting principles. Those trained in commercial bookkeeping have a tendency to lean toward bookkeeping technique and complexity of entry, which are out of place for a working farmer who wishes to do cost accounting. It is not necessary to know a day book from a journal or to know how to prepare a balance sheet in order to keep farm cost accounts.

A FAVORABLE TIME TO START ACCOUNTS

Accounts may be started any time after the last crop is harvested in the fall and before the first crop operations are started in the spring. They should be started on the first day of some month, but the exact date will depend upon the geographical location of the farm and the

nature of the business or type of farming in practice. The time should be as late as possible in order that there may be the smallest quantities of last year's crops on hand to be inventoried. However, the date should be early enough to allow sufficient time to close the year's accounts, work out results, plan the next year's business, and open the new accounts before the spring crop work begins. In a large majority of cases the best date will fall between January 1 and April 1. For a tenant the date of taking an inventory and opening the accounts will, of course, correspond to the date of his lease.

REQUIREMENTS FOR KEEPING A COMPLETE SET OF FARM COST ACCOUNTS

In order to have a complete set of farm-cost accounts four classes of records are necessary.

1. An inventory at the beginning and end of the year.
2. An account of all money paid out or received, and of all purchases or sales on credit.
3. A record of feeds consumed, crop supplies used, and crop yields.
4. A record of all work done by men, horses, tractor, or other power during the year.

In this system of accounts these four classes of records are carried in the three books illustrated on the cover of this bulletin, known as the Inventory Record, Financial Record, and Work Record. In the second book all entries are made of class 3 as well as the cash items of class 2.

INVENTORY RECORD

To make an inventory on an ordinary farm is a matter requiring from two to five hours work at the beginning of each year. The same inventory is used for closing the accounts of one year and opening those of the next. The inventory should be a detailed list, with values of all the farm property and farm debts, and should include:

1. The farm, subdivided into buildings and land (each building being listed separately), giving the number of acres of land and its value per acre. The total value of the land and buildings listed should equal the value of the whole farm. Where there is land of greatly differing values the list should show acreage and value per acre of each kind.
2. The horses, listed by name.
3. The other classes of live stock listed separately, giving value per head.
4. Machinery and tools, each item being listed separately, except that the very small and cheap tools may be listed as one item.
5. Feed, produce, and supplies, giving both quantities and values.
6. Growing crops (value of labor and materials already spent for next year's crops).
7. Cash on hand and in bank.
8. Accounts receivable or amounts owing to the farm for goods sold or services rendered on credit.

The foregoing are known as the "assets" of the business, and the grand total of them all should be found. From this grand total should be subtracted the total of the "liabilities" of the business, which would include the mortgage, if there is one, any notes owed to the bank or others, and all bills which may be owing for goods purchased on credit.

In estimating values, the market price *at the farm*, or price at the market point less the cost of hauling and shipping to market, should be the standard for all marketable produce and live stock; other assets, such as machinery, buildings, and any items of like nature, should receive the "going-concern" value. By "going concern" value is meant what they are worth to the farm as a going business. The value put upon any item should be what it is thought can be obtained for it at normal sale and should neither be overrated nor underrated. It is best to be fair and conservative and to use good judgment in placing values. Value all purchased supplies at cost.

TABLE I.—*Sample of an inventory*

Farm:		
Land:		
Crop land, 92.62 acres, at $96	$8,891.52	
Woods, 22.60 acres, at $40	904.00	
Apple orchard (30 years), 3.83 acres, at $300	1,149.00	
Total land, 119.05 acres		$10,944.52
Buildings:		
Dwelling, 35 by 50, built 1884, cost $3,000	2,500.00	
Tenant house, 35 by 25, built 1864, cost $1,000	788.00	
Barn, 90 by 20, built 1870, cost $3,500	2,900.00	
Hen house, 12 by 90, built 1908, cost $200	178.00	
Total buildings		6,366.00
Total value of farm		17,310.52
Live stock:		
Horses:		
Nell, bay mare, born 1907, cost $250	170.00	
Bell, gray mare, born 1907, cost $250	170.00	
Tom, brown gelding, born 1904, cost $275	110.00	
Dick, chestnut gelding, born 1906, cost $250	120.00	
Total horses (4)	570.00	
Cattle:		
Cows (2), at $75	$150	
Heifer	50	
Total cattle	200.00	
Swine:		
Brood sows (7)	300	
Boar	50	
Hogs (29)	545	
Total swine	895.00	
Poultry:		
Hens and roosters (50)	60.00	
Total value of live stock		1,725.00

Machinery and tools:	Size.	Year bought.	First cost.	No.	Present value.	
Plows, walking	12 in.	1912	$12	2	$7	
Disk, double	6 ft.	1913	28	1	18	
Binder, grain	6 ft.	1911	128	1	55	
and so on through list of machines owned.						
Total value machinery and tools (including items omitted here)						$1,196.25
Farm produce:						
Corn, 50 bushels of ears, at $0.90					$45.00	
Hay, 32 tons, at $20					640.00	
Straw, 2½ tons, at $5					12.50	
Total value of farm produce						697.50
Feed and supplies:						
Bran, 500 pounds, at 2¾ cents					13.75	
Tankage, 1,600 pounds, at 4 cents					64.00	
Lime, 4 bags, at 40 cents					1.60	
Seed oats, 40 bushels, at 64 cents					25.60	
Cement, 2 bags, at 50 cents					1.00	
Total value of feed and supplies						105.95
Growing crops:						
Wheat field B—						
72 hours of man labor, at 30 cents					21.60	
225 hours of horse labor, at 12 cents					27.00	
26 bushels seed wheat, at $2.50					65.00	
1 ton fertilizer, at $34					34.00	
Total value of growing crops						147.60
Account receivable, for 1 cow						70.00
Cash on hand and in bank						252.04
Total value of assets (or property owned)						21,504.86
Farm mortgage (interest due Jan. 1 and July 1)					9,250.00	
Note at bank, due Apr. 18					250.00	
Accounts payable:						
For thrashing bill				$29.76		
For labor				16.11		
On cattle				85.00		
					130.87	
Total "liabilities" (or values owed others)						9,630.87

SUMMARY.

Total value assets	21,504.86
Total liabilities	9,630.87
Present net worth	11,873.99
Net worth one year ago	10,976.50
Gain in net worth	897.49

Table I is presented here as a suggestion as to the way in which the inventory items appear when classified and grouped according to the foregoing schedule, and also illustrates how the net worth is determined and the gain or loss in net property value during the year is set forth.

Figure 1 illustrates how the entries appear in the Inventory Record. It is best to put only one class of property on each page so as to allow for expansion in number in the years to come. It is also shown in this figure how, by trimming intermediate pages, a single

series of certain property item entries may serve for many years by extending the money value of each item to the next succeeding column on each subsequent inventory date. This is a feature of the book that saves much clerical work at inventory time.

No other account will give so valuable information for the time and labor expended as the annual inventory. By comparing the net worth as shown by the current inventory with the net worth of previous years, the farmer can determine whether his business is progressing or going backward.

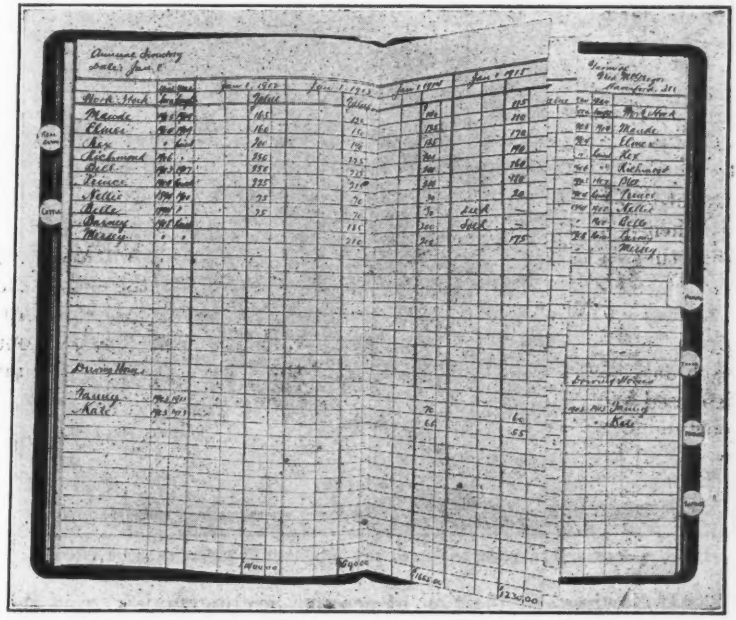


FIG. 1.—Showing how the entries are made in the inventory record.

FINANCIAL, FEED, AND CROP RECORD

For this record, referred to in this bulletin as the Financial Record, a book called by stationers a "broad day-book" or "journal" is used. The requirements are that there be a place for a date on the left-hand side of the page, a broad space in the middle of the page in which to write explanations, and columns ruled for dollars and cents at the right. Two pages facing each other are taken for each account. The name of the account is written at the top of the pages. The right-hand page is marked "Credits" and is used only to record credits to the account. The left-hand page is marked "Charges" and is used only for charges against the account. Figure 2 gives a good idea of how the pages are ruled and the manner in which the entries

are made in this record. At the end of the year this book becomes the completed account book, as to it at that time are entered the items from the other two record books as described later.

A separate account is kept with real estate, each crop grown, each class of animals, machinery, labor, interest, each person dealt with on credit, and such other headings as may be found necessary or convenient.

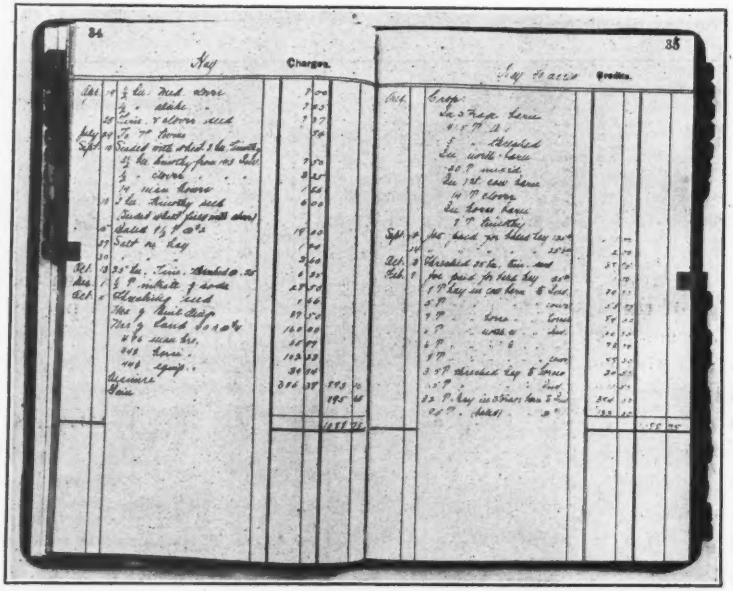


FIG. 2.—Showing how pages are ruled and entries made in the financial record.

The following classification of account headings, taken from the account book of a New York farmer, will give some idea of the number and kind of accounts it may be necessary to keep:

Crop accounts:
- Corn.
- Oats.
- Peas.
- Hay.
- Potatoes.
- Orchard.
- Buckwheat.
- Rye.
- Wheat.

Live stock accounts:
- Cows.
- Hogs.
- Poultry.
- Pasture.

Labor accounts:
- Man labor.
- Horses.
- Equipment.
- Tractor.

General accounts:
- Real estate.
- Feed and supplies.
- Interest.
- Manure.
- Loss and gain.
- Personal.

Next year crops:
- Wheat, etc.

In addition to the foregoing were the accounts with each firm or person with whom dealings were had on credit.

HOW THE ENTRIES ARE MADE

At the end of each day, if time permits, all money received or paid out since the last entries were made should be entered in the

various accounts, *crediting* all money received and *charging* all money paid out. For instance, if on a trip to town on June 1, $1.40 is spent for horseshoeing, $3 for fencing, $5 for cow feed, and a $65 check received for 200 gallons of milk, the entries are made as follows: The account marked "Horses" is found, and on the left-hand page, headed "Charges," is entered "June 1, Shoeing, $1.40." The "Real estate" account is then found, and on the left-hand page is entered "June 1, Fencing, $3." The "Cows" account is next found, and at the left is entered "Cow feed bought, $5," while on the right-hand page, under "Credits," is entered, "June 1, Milk, 200 gals., $65." These entries are now complete. They will never have to be "posted" or entered again in any way.

INDEXING

Finding the account wanted is made easier by indexing the books in the following manner: A piece of adhesive tape about 1½ inches long is bent double and stuck on the edge of the page in such a manner that it projects about a half inch. On this projection is written the name of the account kept on that page. A piece of tape is put on each account, arranged one below the other along the edge of the book so that all may be seen at the same time. Figure 2 illustrates how these tapes appear when properly placed. Prepared paper tabs, suitable for this purpose, can be purchased from most stationers. (See fig. 1.)

FEED AND CROP ENTRIES

All feed bought is charged as purchased directly against the accounts of the animals for which it was secured, the same as any other cash item. If the hog feed should run out some day and a bag of cow feed taken for the hogs, the entries should be made in the record book just as if the cows had sold this feed and the hogs had bought it.

The value of all home-grown feeds consumed must be charged to the live-stock accounts and credited to the crop producing them. This can be done at convenient stated periods, as each week or each month. As home-grown crops are fed out an estimate must be made of the quantities fed to horses, cows, and other stock, and these accounts charged with the values thereof, credit being given the crop accounts. A day's rations may be weighed or estimated once a month or oftener and the proper proportion of the total feed consumed, based on these weighings and the number of days fed, may then be duly charged and credited. This method will give a reasonable degree of accuracy if weights are taken fairly often. When the different classes of animals are fed from separate grain bins and haymows there will be no diffi-

culty in keeping the feed accounts separate, if a record is kept of the quantities put in each at harvest time and sold out from each thereafter.

Where concentrates are purchased in large quantities to be fed to several classes of animals the charge may be made to "Feed and supplies" account and a record kept in the feed room of the quantities fed to each class of animals. Proper charges can be made on the basis of this record and the "Feed and supplies" account credited.

At the time of thrashing or at the close of harvesting a crop, the total yield may be entered as a memorandum on the credit side of the proper crop account, but the values are not yet to be carried to the money column. Yields of hay, straw, etc., can be estimated with fair accuracy by measuring bins and haymows or by counting the number of loads drawn and estimating the actual weight. In all cases allowance for shrinkage should be made. The money values are to be entered as the crop is sold or transferred to the animals. Quantities sold will be known from the weighing bills or otherwise.

When barnyard manure is hauled out to the fields it should not at that time be charged directly to the crop accounts. A "Manure" account is provided to carry all manure charges until the end of the season. The entries in this account should give the crop to which applied, the kind of manure, the number of tons or loads hauled out each day, and the value. At the end of the year the manure account is closed by charging each crop account in a single item for its proportion of the total value of the manure applied thereon, together with the cost of applying, as explained hereafter. (See Table II for sample crop account.)

TABLE II.—*Sample account with potatoes*

Charges.			Credits.		
1918	Item.	Amount.	1918	Item.	Amount.
June 3	Seed, 160 bushels at $1	$160.00	Oct. 5	Sold 226 bushels at $1.05	$237.30
4	Corrosive sublimate, 3 ounces	.60	19	Sold 510 bushels at $1.15	586.50
10	Seed, 43¾ bushels at $1.10	48.13	Nov. 1	Sold 241 bushels at $1.25	301.25
11	Corrosive sublimate, 6 ounces	1.20			
July 12	Paris green, 6 pounds	3.00	Date of closing books.	Saved for seed 135 bushels at $1.00.	135.00
15	Lead arsenate, 160 pounds	25.60		Saved for home use, 16 bushel at 75 cents.	12.00
Date of closing books.	Use of land 5 per cent on $100 per acre.	70.00			
	Man labor, 796 hours at $0.282.	224.47			
	Horse labor, 839 hours at $0.1846.	154.88			
	Equipment use, 839 hours at $0.035.	29.36			
	Manure, 30 per cent of 1916 application.	6.00			
	Manure 40 per cent of 1917 application.	12.00			
	Total charges	735.24		Total credits	1,272.05
	Gain	536.81		Total charges	735.24
	Grand total	1,272.05		Gain	536.81

WORK RECORD

For the Work Record a book like the Financial Record book is used. There must be two double columns at the right of the page as shown in figure 3. This book should be indexed in the manner already described. In this book no separate pages are used for charges and credits and no entries made in terms of dollars and cents. In the first double column at the right-hand side of the page are entered hours and minutes of man labor, and in the second are entered hours and minutes of horse labor. These headings are placed

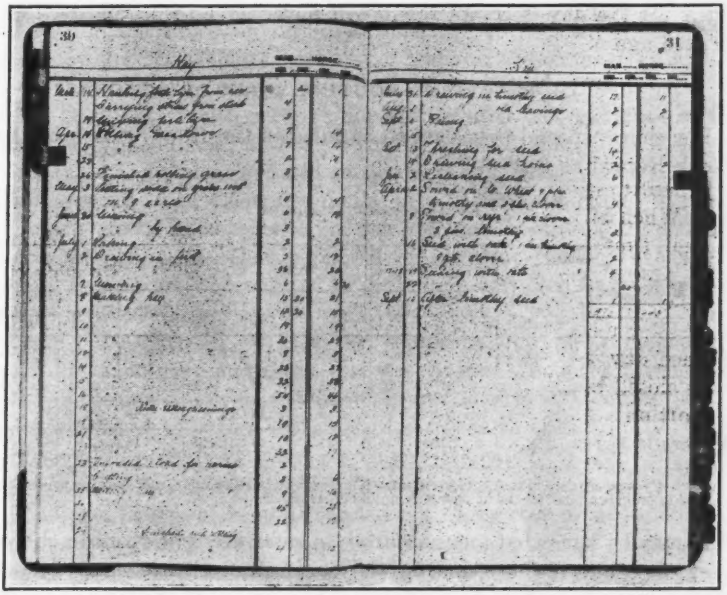


FIG. 3.—Showing how the pages are ruled and headed and the entries made in the work record.

at the top of each double column so that the book appears as shown in figure 3. This book is to receive simply a record of the work done on the farm during the year, classified according to the enterprise for which it was done, and it also gives the date and number of hours for each operation. Where a tractor is in use, the tractor hours may be carried in the narrow space immediately preceding the man-labor columns.

HOW THE ENTRIES ARE MADE

The method of making entries in the Work Record will be understood from the following example: The date is May 1. The work done this day is, aside from chores, drilling oats 6 hours with two

horses; plowing for corn 8 hours with three horses; repairing plow 2 hours. The entries are made as follows: The "Oats" account is found, "May 1" written in the left-hand column, the single word "Drilling" written in the broad space in the middle of the page, and the figure 6 entered under man-hours. Since 2 horses were used for 6 hours, the figure 12 should be entered under horse-hours. In the same way, on turning to the "Corn" account, "May 1, plowing 8 (under man-hours), 24 (under horse-hours)" is entered. Turning to the "Machinery" account, "May 1, repairing plow, 2 (under man-hours)" is entered. When this has been done the work entry for the day is complete; it will never have to be "posted" or written again.

METHOD OF RECORDING ROUTINE WORK OR "CHORES"

For chores special pages are to be ruled in the front or back of the Work Record as follows:

Routine work estimates

Date.	Horses.		Cows.		Poultry.		Hogs.	
	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.
1918.								
May 1	2	20	4	15	.....	30	1	10
May 15	2	40	5	5	1	.....	1	30
Average for May	2	30	4	40	.....	45	1	20
Total for May (31 days)	77	30	144	40	23	15	41	20

NOTE.—If horses are used in the chore work, extra columns must be ruled under each heading where they are used to provide a place for the hours and minutes of horse labor.

It may be somewhat more accurate to enter the time spent in chores every day, but, if chore time is fairly uniform, estimates made two or three times a month will be all that is required. If the time spent on chores changes greatly at any time, for instance when the cows are turned out on pasture in the spring, or when additional stock is purchased, entries should be made so that these changes may be taken into account. On the basis of the estimates of chore labor the total time for the month is figured under each heading. The monthly totals may be charged to the proper accounts once a month, or the total time for the year may be found and charged as a single item just before the books are closed at the end of the year. When any special work is done on live-stock accounts, as for instance when sick animals are cared for, it should be charged direct to the proper account, no attempt being made to allow for it in the chore estimates.

CLASSIFICATION OF TROUBLESOME ITEMS

The entry of some items may be confusing to the beginner. In most cases a little thought coupled with common sense will straighten him out if he will ask himself: "What account produced this value and therefore really deserves this credit?" or, "What account caused this expense and therefore really deserves this charge?"

The "Real estate," "Machinery," and "General expense" accounts usually puzzle the beginner in keeping farm records. All items of permanent improvement or repairs to buildings, fences, ditching, removal of old fences, new buildings, new fences, etc., as well as the insurance on buildings and the real estate taxes, are handled in the "Real estate" account. Many of these are the charges which the landlord usually pays on tenant farms. This account should be credited with receipts for land rented out, old buildings sold, stone or sand sold, and other similar items. Sometimes it may be desirable to open a separate subaccount under this general class when a special improvement is made, as a new silo or barn. When the improvement is completed, its net cost can be figured from this subaccount, which can then be closed by charging the improvement to the "Real estate" account as a single item and crediting the subaccount in like amount.

Against the "Machinery" account should be charged all costs for repairs to machinery and tools, all harness items, and the purchase of new implements or tools, getting them to the farm and setting them up, as well as any fuel or lubricants for the farm engine. This account should be credited when machinery is rented to neighbors or when old machines and junk are sold.

Where a separate account is carried with a tractor or automobile, all items pertaining to these special accounts should, of course, be charged or credited to them and not to the general "Machinery" account.

It is not desirable to keep an account with "General expense," as such an account has proved to be a troublesome one to distribute. Nearly all items can be distributed as they occur. For instance, in the case of telephone rentals, if the telephone is kept for both personal and farm purposes, the rental can be charged partly to "Personal" account and partly to those farm enterprises for which it is mostly used. Other general items, as postage, stationery, etc., can be handled in the same manner. It is nearly always possible to scatter the charges to different accounts as they occur and it saves time when closing the books at the end of the year. If a "General expense" account is found to be indispensable, it should be limited to the fewest possible items.

SUPPLEMENTARY NOTES

There are many supplementary notes which it is desirable to keep in the same books with the accounts. Sometimes they are written on the page of the special account to which they belong; at other times they are kept by themselves at the back of the book. Dates of "last killing frost in spring," "first killing frost in fall," "death of horse or cow," and "height of hay in mow or silage in silo at this [given] date" may be cited as valuable information that may be recorded in this way.

There are other records that may be kept if desired, such as herd records, maps of ditches, maps of the farm showing crops grown each year, and yearly crop records showing fertilizer or manure applied and yields each year. These are not necessary to the success of the cost accounting but are useful at times and may be kept in the back of one of the books if desired.

OPENING THE BOOKS AT THE BEGINNING OF THE YEAR

The opening of the books is not difficult if the inventory is complete and properly prepared. First, an account is opened in the Financial Record with each class of property as shown by the inventory, such as "Real estate," "Horses," "Cows," "Machinery," "Feed and supplies," and other accounts with property, and also with each individual or firm whose name appears in the lists of "Accounts receivable" and "Accounts payable." When these accounts have been opened the inventory amounts under each head are carried to their respective accounts. All "asset" items are entered on the left-hand page of the accounts under "Charges" and the "liability" items as credits on the right-hand page. When all the entries as shown by the inventory have been made, the books are said to have been "opened." Each year, after the books have been finally closed and the results drawn off, the foregoing process is repeated for the accounts of the new year. Other accounts are afterwards opened throughout the year as items occur to be charged or credited to them.

CLOSING THE ACCOUNTS AT THE END OF THE YEAR

Although considerable time may be required to close a set of accounts, this part of the work usually comes at a time of the year when other work is not pressing and when weather conditions are more favorable to working indoors than out. A definite order of procedure should be adhered to in closing the accounts. The following order has proved satisfactory.

1. The first step is to take a final inventory in the same manner as at the beginning of the year.

2. Itemized statements should be requested from all dealers from whom goods are regularly bought on credit. These should all be inspected and any items thereon which have not yet been entered on the books should be entered at once. Memoranda should be made of amounts due the hired men or any other persons. For instance, if a month's wages, $45, is due the hired man, labor account should be charged and a personal account with the hired man credited with this amount. After the first of the new year, when this amount is paid to the hired man, the labor account of the new year should not be charged with it, but the personal account of the hired man should receive this charge and the account be closed. All accrued income and expense of every nature that pertains to the old year and is not yet entered on the books should be handled in this manner.

3. Accounts receivable should be inspected and handled in the same manner described in step No. 2. For instance, if last month's milk check has not yet been received, the amount thereof should be secured by telephone or otherwise and the proper entries made on the books as aforesaid.

4. The "Feed" records are next figured up to date and the corresponding entries made charging the animal accounts and crediting the crop accounts, or "Feed and supplies," as the case may be.

5. The various live-stock accounts should be credited with the value of any feeds charged to them at harvest, or time of purchase and not yet consumed, as they may appear in the final inventory. After the books are closed the animal accounts for the new year should be charged in like amounts in opening the books, the values of these being thus deducted from the expenses of the year in which purchased and being charged against the year in which they were consumed. This is sound accounting practice, and is known as "reversing the entries."

6. The value of pasture utilized by the animals during the year should be charged to their respective accounts and "Pasture" account credited in like amount. The rate charged for pasture should be as near as possible the price for which pasture rents in the region. Pasture account should, of course, be charged with all the expenses of pasture maintenance, as well as for the use of land in pasture as hereafter described.

7. The value of farm produce used in the home, if not entered before, should be attended to next. Included in this would be estimates of the quantities of milk, butter, eggs, potatoes, apples, etc., used by the farmer and his household. Personal account should be charged with these values and the proper animal or crop accounts credited.

8. The value of the board, produce, or other allowances furnished the farm laborers should be estimated and the amount charged against "Labor" account, crediting "Personal" account with the value of the board and the crop or other accounts for the value of the produce or other allowances.

9. The value of the unpaid farm labor done by the farmer and members of his family who are not being paid regular wages should next be estimated and entered. "Labor" account should be charged and "Personal" account credited.

10. The animals should be credited with the value of the manure produced by them during the year and the total value of manure charged against the "Manure" account. These data can be secured from the "Manure" account in the Work Record if the latter has been properly kept.

11. Estimates of proper amounts for the use of the farm buildings for the year should be made. Each crop or class of animals, the "Personal" account, and the accounts with machinery and man labor should receive a charge

proportionate to its use of the buildings and the total amount so charged should be credited to the "Real estate" account. For example, charges for the use of barns on one farm were made as follows:

Distribution of annual charge for use of buildings

(Barns: Value $2,000; use for year at 10 per cent, $200)

Account to be charged.	Per cent of total charge.	Amount.
Cows	30	$60
Horses	20	40
Hogs	5	10
Machinery	10	20
Corn	5	10
Oats	10	20
Hay	20	40
Total	100	200

The use of other kinds of buildings is estimated in the same way, and when all have been so handled the total "Use of buildings" cost is found and charged to each account. As a general rule it is safe to charge 8 to 10 per cent of the current value of ordinary frame farm buildings as annual use cost or rent. Brick, stone, tile, and concrete buildings should take a somewhat lower rate.

12. The Work Record should next be reviewed and the hours and minutes of man labor charged to each account should be added up. The various totals should then be added together and the total hours of man labor found for the year.

13. The total net cost of the "Man labor" account in the Financial Record should then be found by subtracting from the total of the charges the total of any credits. This net cost should then be divided by the total hours of man labor for the year. This gives the man-hour rate. It should be worked out in terms of cents and mills per man-hour.

14. The total hours of man labor, including chores, found against each account in the Work Record should be carried over to the charge page of the same accounts in the Financial Record. The hours should then be multiplied in each case by the man-hour rate (see step 13) and the cost in dollars and cents carried to the money columns, crediting "Man labor" account, item by item, with the same. When this has been completed the "Man labor" account will balance within a small amount. Any difference will be caused by the fact that the man-hour rate was not worked out to sufficient decimal places, as a difference in a tenth of a mill per hour where 6,000 hours are involved would make the account out of balance 60 cents. The difference, if any, may be carried to the "Loss and gain" account and entered on the charge side thereof, if the charge side of the "Man labor" account is greater, and on the credit side if the reverse be true.

15. The total hours and minutes of horse labor are next found in exactly the same manner as the man labor (step 12). Before the net cost of horse labor can be found, interest (at current rates for secured loans) must be charged (see step 20), and the final inventory value of the horses must be credited to their account. After this has been done the net cost of horse labor and the horse-hour rate are determined exactly as for man labor (step 13).

16. The total hours of horse labor against each account in the Work Record are next charged against the same accounts in the Financial Record, the values found by multiplying by the horse-hour rate and extended to the

money columns of the various accounts, and the sum total credited to the "Horse account" exactly similarly to the method of handling the man labor (step 14). If the "Horse account" does not finally balance, it is handled in the same way.

17. The distribution of the annual cost of using machinery is the next step, and it is handled just as were the man and horse labor costs, with a few important exceptions. The inventory value of machinery and any machinery parts on hand at the end of the year is first credited to the "Machinery" account in the Financial Record, interest charged (see step 20), and the net cost for the year ascertained. To distribute this cost is now the problem. There is no record of machinery hours, but such a record can be dug out of the various accounts in the Work Record if desired and an hour rate worked out for each important machine and group of minor tools. This is the most accurate manner in which this cost can be distributed, but while valuable results to the student and investigator would be obtained, it is doubtful whether the practical farmer would find them useful enough to pay for the long process of figuring involved. A shorter method will now be described. It will be assumed that for every hour a horse is worked machinery is also used, and therefore each account should have charged against it the same number of machinery hours as horse hours. Machinery cost may then be distributed on the basis of horse hours. There is only one hitch here. Horse hours have been charged to "Machinery" account, and therefore if this basis is used machinery will have recharged against it a certain proportion of its own cost. This can be obviated by first deducting from the total horse hours the number of horse hours charged to "Machinery" account and using the remainder as the basis for distributing the entire machinery cost. This should now be done, proceeding with the distribution exactly as explained for the man-labor cost (step 14).

18. Any other accounts of convenience, as "Manure," "Feed and supplies," "General expense," etc., should now be distributed and these accounts closed.

19. All other values in the final inventory, not already credited, should be carried to their respective accounts and credited on the right-hand pages thereof.

20. Interest, based on the average inventories of each account (except "Horses" and "Machinery," which have already been charged), should be charged thereto and "Interest" account credited with the total. The rate should be the same as that already used in the two accounts specified.

21. A proper charge to crops and pasture should now be made for the use of the land and the total credited to "Real estate" account. The rate per acre should be high enough to cover interest and taxes but not so high as to make "Real estate" account show any great profit. In fact the "Real estate" account should be, if possible, made to balance by the credit for use of land. This can be done by finding the net balance of the "Real estate" account and dividing by the number of acres to be charged with rent. This will give a rate per acre which can then be handled exactly like that of "Man labor," "Horse," and "Machinery" accounts, and any small balance remaining can be handled in the same way. A point to remember is that if the final inventory value of the real estate has been increased over that at the beginning of the year to keep pace with actual advances in real estate values in the locality, such advanced values should not be used in making the above distribution, but the amount of such advance should be first taken out of the account and carried to "Loss and gain" account as a separate, distinct gain.

22. Both sides of the crop, live stock, pasture, and any other enterprise accounts should now be footed up and the lesser total subtracted from the greater

to obtain the balance as shown by each account. These balances are now to be closed to "Loss and gain" account. If the charge side is greater in an account the excess represents a loss and should be carried to the "Loss and gain" account as such by entering it on the left-hand page under charges. If the credit side of an account be greater a profit has been made and should be carried accordingly to the credit side of the "Loss and gain" account. Table II illustrates a crop account on which a gain of $536.81 has been closed to "Loss and gain" account.

23. Both sides of the "Loss and gain" account should now be footed up, the lesser subtracted from the greater, and thus the net gain or loss for the year determined.

When all these steps have been completed the books are said to be finally "closed." It is a good plan to make up a Profit and Loss Statement for the year for convenience in further study of the year's business and to preserve, for comparison with similar statements for future years. Such a statement may be prepared in the following manner:

Statement of losses and gains, 1918

Account.	Number of acres or animals.	Losses.	Gains.	Per acre or animal.	
				Loss.	Gain.
Cows	19		$359.11		$18.90
Hogs	3		14.82		4.94
Poultry	82		19.65		.24
Corn	10.5		26.60		2.53
Potatoes	14		536.81		38.34
Wheat	4.5		35.17		7.80
Rye	3	$19.91		$6.64	
Oats	15	3.84		.26	
Buckwheat	5	13.63		2.73	
Peas	6		35.39		5.90
Hay	40		195.65		4.89
Orchard	3		148.52		49.51
General expense		151.45			
Totals		188.83	1,371.72		
Subtracting the lesser			188.83		
Net gain on farm enterprises			1,182.89		
Personal accounts:					
Interest			388.00		
Personal			373.85		
			1,944.74		

STUDY AND INTERPRETATION OF RESULTS

Unless studied, farm accounts are of little use to help make business more profitable in the future. It is just as important to study the different items of cost and returns in an account as to know whether or not it pays. Weather conditions, crop conditions, and market conditions for the year, as compared with an average year, must be considered. For instance, potatoes in some year may show heavy losses on many farms because of low prices or losses by rot. By studing the potato account to find the factors of production, and

considering a normal yield and price for the locality, conclusions could be reached as to whether ordinarily it would or would not be profitable to raise potatoes.

The potato account in Table II when studied, yields the following figures:

Total acreage	14
Total yield (bushels)	1,128
Total cost	$735.24
Total value	$1,272.05
Total profit	$536.81
Yield per acre (bushels)	80.6
Cost per acre	$52.52
Value per acre	$90.86
Profit per acre	$38.34
Man hours per acre	57
Horse hours per acre	60
Labor cost per acre	$27.10
Cost per bushel	$0.652
Value per bushel	$1.128
Profit per bushel	$0.476
Net return per hour of man labor	$0.672

Besides the satisfaction of knowing which crops or enterprises paid and how much, there are many other ways in which the accounts may be useful. They may be used to study the seasonal distribution of the labor on the farm as a whole and on certain enterprises, disclosing just where the rush seasons occur and what causes them. They may be used to compare results with neighbors, or with published cost records in newspapers and bulletins. The results of such comparisons should be to teach methods by which labor can be saved, thus cheapening production and correspondingly increasing the chances of a good profit.

By keeping cost accounts an idea of the value of labor will be gained, it is soon discovered that time represents money, and that it is as important to save one as the other. The results set forth by the accounts will often give a farmer many surprises. Sometimes it is found that the enterprises which he thinks are the best and to which he devotes most of his time do not show up so well financially as the enterprises that get little attention.

Cost accounts, carefully and consistently kept, year after year, are certain to develop both the business of farming and the farmer's power of analyzing the causes and effects involved in his operations.

PUBLICATIONS OF THE UNITED STATES DEPARTMENT OF AGRICULTURE AND STATE INSTITUTIONS RELATING TO FARM COST ACCOUNTING

[Many of the bulletins in this list may be obtained free upon application to the United States Department of Agriculture, or to the agricultural experiment station of the proper State; the others may be consulted in agricultural college libraries.]

METHODS OF FARM ACCOUNTING

A Method of Analyzing the Farm Business. (U. S. Dept. Agr. Farmers' Bulletin 661.)

Farm Bookkeeping. (U. S. Dept. Agr. Farmers' Bulletin 511.)

The Use of a Diary for Farm Accounts. (U. S. Dept. Agr. Farmers' Bulletin 782.)

Value of Records to the Farmer. (U. S. Dept. Agr. Yearbook Separate 735.)

Farm Records and Accounts. (Montana Agr. Exp. Sta. Circular 43.)

Real Profits from the Dairy Business as Measured by Cost Accounting. (New York Dept. Agr. Bulletin 86.)

COST OF PRODUCTION

An Economic Study of Farming in Sumter County, Georgia. (U. S. Dept. Agr. Bul. 492.)

A Farm-Management Survey in Brooks County, Georgia. (U. S. Dept. Agr. Bul. 648.)

A Farm-Management Study in Anderson County, South Carolina. U. S. Dept. Agr. Bul. 651.)

A Farm-Management Study of Cotton Farms of Ellis County, Tex. (U. S. Dept. Agr. Bul. 659.)

Cost of Market Milk. (U. S. Dept. Agr. Farmers' Bul. 469.)

The Cost of Milk Production Computed on the Year Basis. (Illinois Agr. Exp. Sta. Bul. 216.)

Dairy Production in Ohio. (Ohio Agr. Exp. Sta. Bul. 334.)

The Cost of Producing Farm Products; Methods of Investigation; Cost of Growing Minnesota Field Crops, 1902, 1903, 1904. (U. S. Dept. Agr., Bur. Statis. Bul. 48; Minnesota Agr. Exp. Sta. Bul. 97.)

The Cost of Production of Corn and Oats in Illinois in 1896. (Illinois Agr. Exp. Sta. Bul. 50.)

The Cost of Production on Missouri Farms. (Missouri Agr. Exp. Sta. Bul. 125.)

Labor Requirements of Crop Production. (Minnesota Agr. Exp. Sta. Bul. 157.)

The Cost of Crop Production. (New York Dept. of Agr. Bul. 86, p. 2251–2257.)

Amount and Cost of Labor Required for Growing Crops in West Virginia. (West Virginia Agr. Exp. Sta. Bul. 163.)

Cost Accounts on Some New York Farms. (New York Cornell Agr. Exp. Sta. Bul. 377.)

Cost of Farm Crops. (Nebraska Agr. Exp. Sta. Bul. 29. 1893.)

Results of Three Years' Experiments in Cost and Profit of Growing Wheat. (Wyoming Agr. Exp. Sta. Bul. 25.)

Farm Cost on the Colorado Agricultural College Farm. (Colorado Agr. Exp. Sta. Bul. 203.)

Cost of Producing Field Crops, 1908–1912. (Minnesota Farmers' Library Agr. Ext. Bul. 59.)

The Cost of Minnesota Dairy Products, 1904–1909. (Minnesota Agr. Exp. Sta. Bul. 124; U. S. Dept. Agr., Bur. Statis. Bul. 88.)

The Cost of Growing Wheat on Typical Nonirrigated Areas in Montana. (Montana Agr. Exp. Sta. Bul. 122.)

Cost of Milk Production. (New York State Dept. Agr. Bul. 35.)

Records of a Dairy Herd for Five Years. (Connecticut Storrs Agr. Exp. Sta. Bul. 7.)

Cost of Milk Production. (New Hampshire Col. and Exp. Sta. Ext. Bul. 2.)

The Cost of Milk Production. (New York Cornell Agr. Exp. Sta. Bul. 357.)

Cost of Producing Milk on 174 Farms in Delaware County, New York. (New York Cornell Agr. Exp. Sta. Bul. 364.)

Studies in the Cost of Market Milk Production. (Michigan Agr. Exp. Sta. Bul. 277.)

The Cost of Milk Production. (Massachusetts Agr. Col. Ext. Bul. 11.)

Cost of Producing Milk on Four Dairy Farms Located in Wisconsin, Michigan, Pennsylvania, and North Carolina. (U. S. Dept. Agr. Bul. 501.)

The Cost of Milk and Fat Production in Vermont in 1911 and 1912. (Vermont Agr. Exp. Sta. Bul. 202.)

The Cost of Producing Market Milk in 1916–17 on 212 Vermont Farms. (Vermont Agr. Exp. Sta. Bul. 209; Vermont Col. Agr. Ext. Circ. 7.)

The Cost of Milk Production in Massachusetts. (Massachusetts Agr. Col. Ext. Bul. 19.)

Milk Production Costs and Milk Prices. (Missouri Agr. Exp. Sta. Bul. 156.)

Profits from Milk Cows on General Cornbelt Farms. (Missouri Agr. Exp. Sta. Bul. 159.)

The Cost of Milk Production. (Minnesota Agr. Exp. Sta. Bul. 173.)

The Cost of Producing Minnesota Field Crops, 1913–1917. (Minnesota Agr. Exp. Sta. Bul. 179.)

Cost of Growing Crops in Nebraska. (Nebraska Agr. Exp. Sta. Bul. 122.)

Investigation of the Cost of Milk Production in Western Washington. (Western Washington Agr. Exp. Sta., Mp. Bul. v. 6, No. 5, p. 63–69.)

The Cost of Producing Minnesota Farm Products, 1902–1907. U. S. Dept. Agr., Bur. Statis. Bul. 73; Minnesota Agr. Exp. Sta. Bul. 117.)

Cost of Producting Farm Crops. (North Dakota Agr. Exp. Sta. Bul. 104.)

The Cost of Producing Minnesota Farm Products, 1908–1912. (Minnesota Agr. Exp. Sta. Bul. 145.)

The Cost and Feeding Value of the Dry Matter of Dried Corn Fodder and of Silage. New Jersey Agr. Exp. Sta. Bul. 122.)

Further Experiments on the Economic Value of Root Crops for New York. (New York Cornell Agr. Exp. Sta. Bul. 317.)

Labor Cost of Producing Corn in Ohio. (Ohio Agr. Exp. Sta. Bul. 266.)

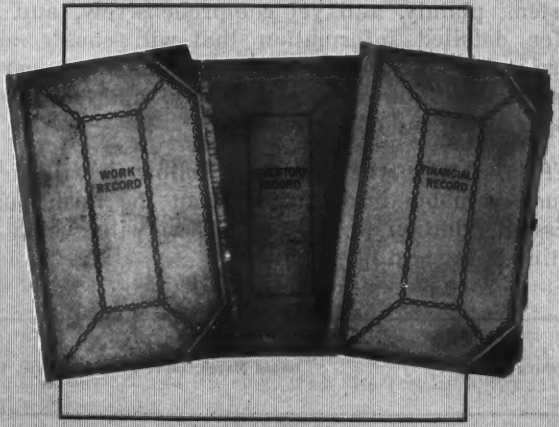
○

LIBRARY
RECEIVED

U. S. DEPARTMENT OF AGRICULTURE

FARMERS' BULLETIN No. 572
Oct. 1924

A SYSTEM OF FARM COST ACCOUNTING



THE INCREASED interest in cost of production of farm products has stimulated the demand for systems of farm cost accounting, and especially for a system that is simple in application and planned to give the farmer the information he requires without going into the complexity of detail involved in a highly technical system.

It is the object of this bulletin to explain such a system, plainly, and yet comprehensively, and to offer detailed information that will enable any farmer to make an inventory, open his books, carry his accounts through successfully, and close his books at the end of the year.

This system, when properly followed, will yield much valuable information about the farm business in addition to providing data with which to estimate the cost of production.

Washington, D. C. Issued March, 1914; revised October, 1924

A SYSTEM OF FARM COST ACCOUNTING

By C. E. LADD, *Agent*
Revised by JAMES S. BALL, *Assistant in Farm Accounting, Bureau of Agricultural Economics*

CONTENTS

	Page		Page
Time required to keep accounts	2	How the entries are made	9
A favorable time to start accounts	2	Classification of troublesome items	11
Requirements for keeping farm cost accounts	3	Supplementary notes	12
Inventory record	3	Opening books at beginning of year	12
Financial, feed, and crop record	5	Closing accounts at end of year	12
Work record	9	Study and interpretation of results	16

THE BUSINESS FARMER wishes to know how much he is making or losing on his business each year, how much he is making or losing on each crop or class of animals, and how he can improve his business so as to make more money. The function of farm cost accounting is to supply this information. Cost accounting for the farm is the same sort of work large manufacturing companies do to learn whether they are making a profit on their different products. The farmer wants to know whether his wheat pays, whether his cows pay, or his orchard. These are some of the questions a set of farm cost accounts will settle.

Many farmers are desirous of keeping accounts of this sort but do not know how to start. Undoubtedly many are deterred from starting because they believe they do not know enough about bookkeeping and because they have in mind no definite method of procedure. To any such men who desire to keep accounts and who have not worked out a system for themselves, it is believed that the system outlined in this bulletin will be helpful. Those who are already keeping accounts but are not satisfied with the results obtained may find here some suggestions of value.

No cost accounting can be absolutely exact. Commercial cost accounting and farm cost accounting are alike in this respect. Both are based partly on estimates and partly on ascertainable facts, and both approach exactitude in proportion to the accuracy of these estimates. It is therefore important to make the most accurate estimates possible rather than be satisfied with rough approximations.

NOTE.—This System of Farm Cost Accounting was developed by Prof. G. F. Warren, of the New York State College of Agriculture, on his own farm, where it has been used for 12 years. The principles of the system are outlined in his book entitled "Farm Management." It has been given a thorough trial for 8 years with a number of farmers under the immediate supervision of Mr. Ladd and others, working jointly for the U. S. Department of Agriculture and the New York College of Agriculture, and has given excellent satisfaction and valuable results.

As the work is carried on year by year and experience is gained, greater accuracy in estimating is attained, with correspondingly greater accuracy in the results of the cost accounts.

On the other hand it is not wise to spend much time with refinements in methods of bookkeeping that are designed to check to the last cent. In fact, attempts to find insignificant errors often disgust inexperienced persons with the whole question of accounting.

This bulletin aims to give a description of a successful system of farm accounting which has been tried for eight years in the State of New York with a number of farmers under widely differing conditions. It is aimed herein to outline the practical working of the system in sufficient detail so that any one who wishes may start it without further aid. No bookkeeping knowledge is necessary.

This is a "direct-entry" system, in that there are no preliminary books in which the original entries are to be made and from which they are to be "posted" or copied to the permanent accounts. This feature is a valuable one for the farmer who keeps his own books in that it does away with "posting" and saves much time. It is, however, often advisable in busy seasons to keep a pocket memorandum book in which to make notes from day to day so that nothing is forgotten or overlooked.

TIME REQUIRED TO KEEP ACCOUNTS

The time required is one of the chief objections made to farm cost accounting. Farmers who have used this particular system during the past eight years estimate it takes only from 2 to 10 minutes per day. The average seems to be about 5 minutes for the daily entries. To this must be added a number of hours' work, or perhaps a day or two, at the end of the year to close the year's accounts and open the books for the new year. This time will vary with the type of farming, the complexity of the business, and the degree of accuracy and completeness with which the accounts have been kept.

The daily work of keeping this set of accounts ordinarily consists in entering the receipts and expenditures for the day and recording the hours of work done. On many days there are no cash receipts and expenditures, as these are likely to be bunched on the days when trips are made to town. The entry of these items to the proper accounts, with the filling of the chore blanks, if necessary, should not take more than five minutes. It is being done in less than an average of five minutes per day by a number of New York farmers whose education varies from that acquired at a district school to that of the college graduate, all of whom are working every day in the field with their hired men.

A FAVORABLE TIME TO START ACCOUNTS

Accounts may be started any time after the last crop is harvested in the fall and before the first crop operations are started in the spring. They should be started on the first day of some month, but the exact date will depend upon the geographical location of the farm and the nature of the business or type of farming in practice. The time should be as late as possible in order that there may be the smallest quantities of last year's crops on hand to be inventoried. However, the date should be early enough to allow sufficient time to

close the year's accounts, work out results, plan the next year's business, and open the new accounts before the spring crop work begins. In a large majority of cases the best date will fall between January 1 and April 1. For a tenant the date of taking an inventory and opening the accounts will, of course, correspond to the date of his lease.

REQUIREMENTS FOR KEEPING A COMPLETE SET OF FARM COST ACCOUNTS

In order to have a complete set of farm cost accounts four classes of records are necessary.

1. An inventory at the beginning and end of the year.
2. An account of all money paid out or received, and of all purchases or sales on credit.
3. A record of feeds consumed, crop supplies used, and crop yields.
4. A record of all work done by men, horses, tractor, or other power during the year.

In this system these four classes of records are carried in the three books illustrated on the title page of this bulletin, known as the Inventory Record, Financial Record, and Work Record. In the second book all entries are made of class 3 as well as the cash items of class 2.

INVENTORY RECORD

To make an inventory on an ordinary farm is a matter requiring from two to five hours work at the beginning of each year. The same inventory is used for closing the accounts of one year and opening those of the next. The inventory should be a detailed list, with values of all the farm property and farm debts, and should include:

1. The farm, subdivided into buildings and land (each building being listed separately), giving the number of acres of land and its value per acre. The total value of the land and buildings listed should equal the value of the whole farm. Where there is land of greatly differing values the list should show acreage and value per acre of each kind.
2. The horses, listed by name.
3. The other classes of livestock listed separately, giving value per head.
4. Machinery and tools, each item being listed separately, except that the very small and cheap tools may be listed as one item.
5. Feed, produce, and supplies, giving both quantities and values.
6. Growing crops (value of labor and materials already spent for next year's crops).
7. Cash on hand and in bank.
8. Accounts receivable or amounts owing to the farm for goods sold or services rendered on credit.

The foregoing are known as the "assets" of the business, and the grand total of them all should be found. From this grand total should be subtracted the total of the "liabilities" of the business, which would include the mortgage, if there is one, any notes owed to the bank or others, and all bills which may be owing for goods purchased on credit.

In estimating values, the market price *at the farm*, or price at the market point, less the cost of hauling and shipping to market, should be the standard for all marketable produce and livestock; other assets, such as machinery, buildings, and any items of like nature,

should receive the "going-concern" value. By "going-concern" value is meant what they are worth to the farm as a going business. The value put upon any item should be what it is thought can be obtained for it at normal sale and should neither be overrated nor underrated. It is best to be fair and conservative and to use good judgment in placing values. Value all purchased supplies at cost.

Table 1 is presented here as a suggestion as to the way in which the inventory items appear when classified and grouped according to the foregoing schedule, and also illustrates how the net worth is determined and the gain or loss in net property value during the year is set forth.

TABLE 1.—*Sample of an inventory*

Farm:			
Land—			
Crop land, 92.62 acres, at $96		$8,891.52	
Woods, 22.60 acres, at $40		904.00	
Apple orchard (30 years), 3.83 acres, at $300		1,149.00	
Total land, 119.05 acres			$10,944.52
Buildings—			
Dwelling, 35 by 50, built 1884, cost $3,000		2,500.00	
Tenant house, 35 by 25, built 1864, cost $1,000		788.00	
Barn, 90 by 20, built 1870, cost $3,500		2,900.00	
Hen house, 12 by 90, built 1908, cost $200		178.00	
Total buildings			6,366.00
Total value of farm			17,310.52
Livestock:			
Horses—			
Nell, bay mare, born 1907, cost $250		170.00	
Bell, gray mare, born 1907, cost $250		170.00	
Tom, brown gelding, born 1904, cost $275		110.00	
Dick, chestnut gelding, born 1906, cost $250		120.00	
Total horses (4)		570.00	
Cattle—			
Cows (2), at $75	$150		
Heifer	50		
Total cattle		200.00	
Swine—			
Brood sows (7)	300		
Boar	50		
Hogs (29)	545		
Total swine		895.00	
Poultry—			
Hens and roosters (50)		60.00	
Total value of livestock			1,725.00

Machinery and tools:	Size	Year bought	First cost	No.	Present value
Plows, walking	12 in.	1912	$12	2	$7
Disk, double	6 ft.	1913	28	1	18
Binder, grain	6 ft.	1911	128	1	55

and so on through list of machines owned.

Total value machinery and tools (including items omitted here)		1,196.25
Farm produce:		
Corn, 50 bushels of ears, at $0.90	$45.00	
Hay, 32 tons, at $20	640.00	
Straw, 2½ tons, at $5	12.50	
Total value of farm produce		697.50

TABLE 1.—*Sample of an inventory*—Continued

Feed and supplies:		
Bran, 500 pounds, at 2¾ cents	$13.75	
Tankage, 1,600 pounds, at 4 cents	64.00	
Lime, 4 bags, at 40 cents	1.60	
Seed oats, 40 bushels, at 64 cents	25.60	
Cement, 2 bags, at 50 cents	1.00	
Total value of feed and supplies		$105.95
Growing crops:		
Wheat field B—		
72 hours of man labor, at 30 cents	21.60	
225 hours of horse labor, at 12 cents	27.00	
26 bushels seed wheat, at $2.50	65.00	
1 ton fertilizer, at $34	34.00	
Total value of growing crops		147.60
Account receivable, for 1 cow		70.00
Cash on hand and in bank		252.04
Total value of assets (or property owned)		21,504.86
Farm mortgage (interest due Jan. 1 and July 1)	9,250.00	
Note at bank, due Apr. 18	250.00	
Accounts payable:		
For thrashing bill	$29.76	
For labor	16.11	
On cattle	85.00	
	130.87	
Total "liabilities" (or values owed others)		9,630.87
SUMMARY		
Total value assets		21,504.86
Total liabilities		9,630.87
Present net worth		11,873.99
Net worth one year ago		10,976.50
Gain in net worth		897.49

Figure 1 illustrates how the entries appear in the Inventory Record. It is best to put only one class of property on each page so as to allow for expansion in number in the years to come. It is also shown in this figure how, by trimming intermediate pages, a single series of certain property item entries may serve for many years by extending the money value of each item to the next succeeding column on each subsequent inventory date. This is a feature of the book that saves much clerical work at inventory time.

No other account will give so valuable information for the time and labor expended as the annual inventory. By comparing the net worth as shown by the current inventory with the net worth of previous years, the farmer can determine whether his business is progressing or going backward.

FINANCIAL, FEED, AND CROP RECORD

For this record, referred to in this bulletin as the Financial Record, a book called by stationers a "broad day-book" or "journal" is used. The requirements are that there be a place for a date on the left-hand side of the page, a broad space in the middle of the page in which to write explanations, and columns ruled for dollars and cents at the right. Two pages facing each other are taken for each account. The name of the account is written at the top of the pages. The

right-hand page is marked "Credits" and is used only to record credits to the account. The left-hand page is marked "Charges" and is used only for charges against the account. Figure 2 gives a good idea of how the pages are ruled and the manner in which the entries are made in this record. At the end of the year this book becomes the completed account book, as to it at that time are entered the items from the other two record books as described later.

A separate account is kept with real estate, each crop grown, each class of animals, machinery, labor, interest, each person dealt with on credit, and such other headings as may be found necessary or convenient.

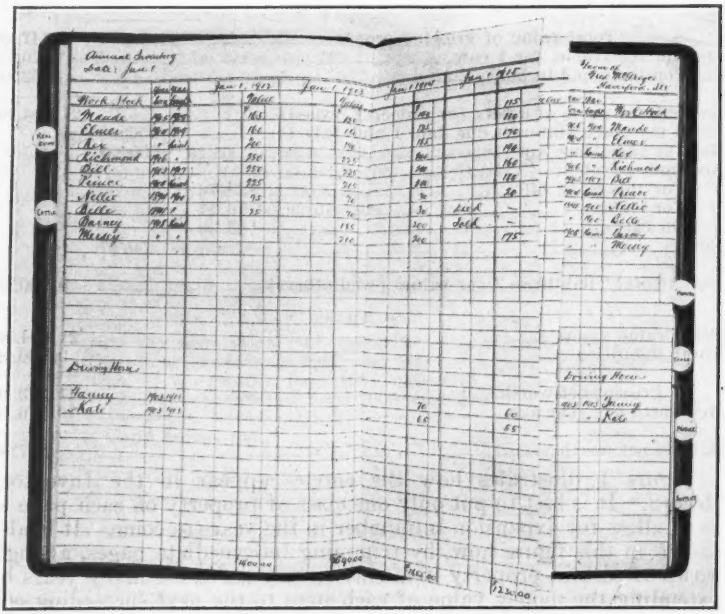


FIG. 1.—Showing how the entries are made in the Inventory Record

The following classification of account headings, taken from the account book of a New York farmer, will give some idea of the number and kind of accounts it may be necessary to keep:

Crop accounts:	Livestock accounts:	General accounts:
Corn.	Cows.	Real estate.
Oats.	Hogs.	Feed and supplies.
Peas.	Poultry.	Interest.
Hay.	Pasture.	Manure.
Potatoes.	Labor accounts:	Loss and gain.
Orchard.	Man labor.	Personal.
Buckwheat.	Horses.	Next year crops:
Rye.	Equipment.	Wheat, etc.
Wheat.	Tractor.	

In addition to the foregoing were the accounts with each firm or person with whom dealings were had on credit.

HOW THE ENTRIES ARE MADE

At the end of each day, if time permits, all money received or paid out since the last entries were made should be entered in the various accounts, *crediting* all money received and *charging* all money paid out. For instance, if on a trip to town on June 1, $1.40 is spent for horseshoeing, $3 for fencing, $5 for cow feed, and a $65 check received for 200 gallons of milk, the entries are made as follows: The account marked "Horses" is found, and on the left-hand page, headed "Charges," is entered "June 1, Shoeing, $1.40." The "Real estate" account is then found, and on the left-hand page is entered "June 1, Fencing, $3." The "Cows" account is

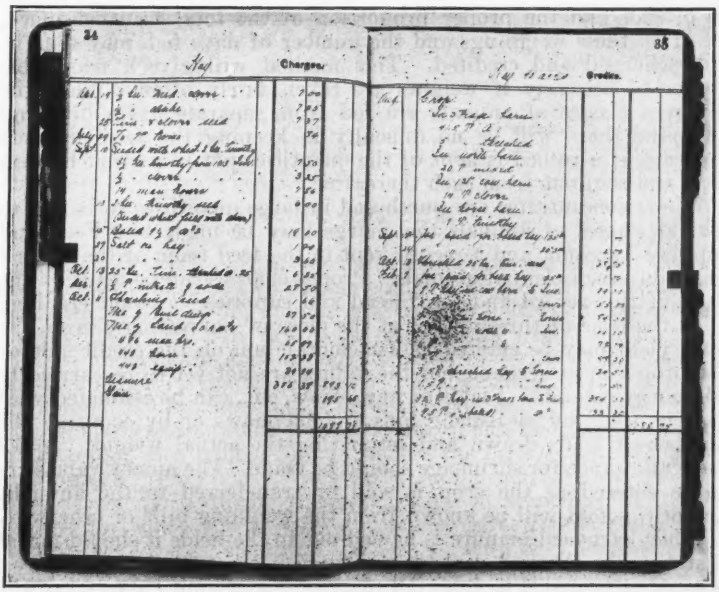


FIG. 2.—Showing how pages are ruled and entries made in the Financial Record

next found, and at the left is entered "Cow feed bought, $5," while on the right-hand page, under "Credits," is entered, "June 1, Milk, 200 gals., $65." These entries are now complete.

Indexing.—Finding the account wanted is made easier by indexing the books in the following manner: A piece of adhesive tape about 1½ inches long is bent double and stuck on the edge of the page in such a manner that it projects about a half inch. On this projection is written the name of the account kept on that page. A piece of tape is put on each account, arranged one below the other along the edge of the book so that all may be seen at the same time. Figure 2 illustrates how these tapes appear when properly placed. Prepared paper tabs, suitable for this purpose, can be purchased from most stationers. (See fig. 1.)

Feed and crop entries.—All feed bought is charged as purchased directly against the accounts of the animals for which it was secured, the same as any other cash item. If the hog feed should run out some day and a bag of cow feed taken for the hogs, the entries should be made in the record book just as if the cows had sold this feed and the hogs had bought it.

The value of all home-grown feeds consumed must be charged to the livestock accounts and credited to the crop producing them. This can be done at convenient stated periods, as each week or each month. As home-grown crops are fed out an estimate must be made of the quantities fed to horses, cows, and other stock, and these accounts charged with the values thereof, credit being given the crop accounts. A day's rations may be weighed or estimated once a month or oftener and the proper proportion of the total feed consumed, based on these weighings and the number of days fed, may then be duly charged and credited. This method will give a reasonable degree of accuracy if weights are taken fairly often. When the different classes of animals are fed from separate grain bins and haymows there will be no difficulty in keeping the feed accounts separate, if a record is kept of the quantities put in each at harvest time and sold out from each thereafter.

Where concentrates are purchased in large quantities to be fed to several classes of animals the charge may be made to "Feed and supplies" account and a record kept in the feed room of the quantities fed to each class of animals. Proper charges can be made on the basis of this record and the "Feed and supplies" account credited.

At the time of threshing or at the close of harvesting a crop, the total yield may be entered as a memorandum on the credit side of the proper crop account, but the values are not yet to be carried to the money column. Yields of hay, straw, etc., can be estimated with fair accuracy by measuring bins and haymows or by counting the number of loads drawn and estimating the actual weight. In all cases allowance for shrinkage should be made. The money values are to be entered as the crop is sold or transferred to the animals. Quantities sold will be known from the weighing bills or otherwise.

When barnyard manure is hauled out to the fields it should not at that time be charged directly to the crop accounts. A "Manure" account is provided to carry all manure charges until the end of the season. The entries in this account should give the crop to which applied, the kind of manure, the number of tons or loads hauled out each day, and the value. At the end of the year the manure account is closed by charging each crop account in a single item for its proportion of the total value of the manure applied thereon, together with the cost of applying, as explained hereafter. (See Table 2 for sample crop account.)

TABLE 2.—*Sample account with potatoes*

Charges			Credits		
1918	Item	Amount	1918	Item	Amount
June 3	Seed, 160 bushels at $1	$160.00	Oct. 5	Sold 226 bushels at $1.05	$237.30
4	Corrosive sublimate, 3 ounces	.60	19	Sold 510 bushels at $1.15	586.50
10	Seed, 43¾ bushels at $1.10	48.13	Nov. 1	Sold 241 bushels at $1.25	301.25
11	Corrosive sublimate, 6 ounces	1.20			
July 12	Paris green, 6 pounds	3.00	Date of closing books.	Saved for seed 135 bushels at $1.00.	135.00
15	Lead arsenate, 160 pounds	25.60		Saved for home use, 16 bushels at 75 cents.	12.00
Date of closing books.	Use of land 5 per cent on $100 per acre.	70.00			
	Man labor, 796 hours at $0.282	224.47			
	Horse labor, 839 hours at $0.1846	154.88			
	Equipment use, 839 hours at $0.035.	29.36			
	Manure, 30 per cent of 1916 application.	6.00			
	Manure, 40 per cent of 1917 application.	12.00			
	Total charges	735.24		Total credits	1,272.05
	Gain	536.81		Total charges	735.24
	Grand total	1,272.05		Gain	536.81

WORK RECORD

For the Work Record a book like the Financial Record book is used. There must be two double columns at the right of the page as shown in Figure 3. This book should be indexed in the manner already described. In this book no separate pages are used for charges and credits and no entries made in terms of dollars and cents. In the first double column at the right-hand side of the page are entered hours and minutes of man labor, and in the second are entered hours and minutes of horse labor. These headings are placed at the top of each double column so that the book appears as shown in Figure 3. This book is to receive simply a record of the work done on the farm during the year, classified according to the enterprise for which it was done, and it also gives the date and number of hours for each operation. Where a tractor is in use, the tractor hours may be carried in the narrow space immediately preceding the man-labor columns.

HOW THE ENTRIES ARE MADE

The method of making entries in the Work Record will be understood from the following example: The date is May 1. The work done this day is, aside from chores, drilling oats 6 hours with two horses; plowing for corn 8 hours with three horses; repairing plow 2 hours. The entries are made as follows: The "Oats" account is found, "May 1" written in the left-hand column, the single word "Drilling" written in the broad space in the middle of the page, and the Figure 6 entered under man-hours. Since 2 horses were used for 6 hours, the Figure 12 should be entered under horse-hours. In the same way, on turning to the "Corn" account, "May 1, plowing 8 (under man-hours), 24 (under horse-hours)" is entered. Turning to the "Machinery" account, "May 1, repairing plow, 2

(under man-hours)" is entered. When this has been done the work entry for the day is complete.

Recording routine work or "chores."—For chores special pages are to be ruled in the front or back of the Work Record as follows:

Routine work estimates

Date	Horses		Cows		Poultry		Hogs	
	Hours	Minutes	Hours	Minutes	Hours	Minutes	Hours	Minutes
1918								
May 1	2	20	4	15		30	1	10
May 15	2	40	5	5	1		1	30
Average for May	2	30	4	40		45	1	20
Total for May (31 days)	77	30	144	40	23	15	41	20

NOTE.—If horses are used in the chore work, extra columns must be ruled under each heading where they are used to provide a place for the hours and minutes of horse labor.

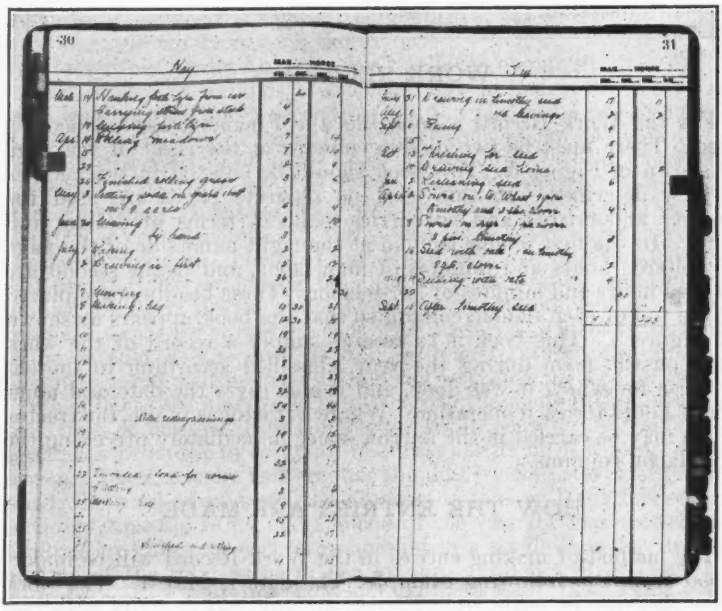


FIG. 3.—Showing how the pages are ruled and headed and the entries made in the Work Record.

It may be somewhat more accurate to enter the time spent in chores every day, but, if chore time is fairly uniform, estimates made two or three times a month will be all that is required. If the time spent on chores changes greatly at any time, for instance when the cows are turned out on pasture in the spring, or when additional stock is purchased, entries should be made so that these changes may be taken into account. On the basis of the estimates

of chore labor the total time for the month is figured under each heading. The monthly totals may be charged to the proper accounts once a month, or the total time for the year may be found and charged as a single item just before the books are closed at the end of the year. When any special work is done on livestock accounts, as for instance when sick animals are cared for, it should be charged direct to the proper account, no attempt being made to allow for it in the chore estimates.

CLASSIFICATION OF TROUBLESOME ITEMS

The entry of some items may be confusing to the beginner. In most cases a little thought coupled with common sense will straighten him out if he will ask himself: "What account produced this value and therefore really deserves this credit?" or, "What account caused this expense and therefore really deserves this charge?"

The "Real estate," "Machinery," and "General expense" accounts usually puzzle the beginner in keeping farm records. All items of permanent improvement or repairs to buildings, fences, ditching, removal of old fences, new buildings, new fences, etc., as well as the insurance on buildings and the real estate taxes, are handled in the "Real estate" account. Many of these are the charges which the landlord usually pays on tenant farms. This account should be credited with receipts for land rented out, old buildings sold, stone or sand sold, and other similar items. Sometimes it may be desirable to open a separate subaccount under this general class when a special improvement is made, as a new silo or barn. When the improvement is completed, its net cost can be figured from this subaccount, which can then be closed by charging the improvement to the "Real estate" account as a single item and crediting the subaccount in like amount.

Against the "Machinery" account should be charged all costs for repairs to machinery and tools, all harness items, and the purchase of new implements or tools, getting them to the farm and setting them up, as well as any fuel or lubricants for the farm engine. This account should be credited when machinery is rented to neighbors or when old machines and junk are sold.

Where a separate account is carried with a tractor or automobile, all items pertaining to these special accounts should be charged or credited to them and not to the general "Machinery" account.

It is not desirable to keep an account with "General expense," as such an account has proved to be a troublesome one to distribute. Nearly all items can be distributed as they occur. For instance, in the case of telephone rentals, if the telephone is kept for both personal and farm purposes, the rental can be charged partly to "Personal" account and partly to those farm enterprises for which it is mostly used. Other general items, as postage, stationery, etc., can be handled in the same manner. It is nearly always possible to scatter the charges to different accounts as they occur and it saves time when closing the books at the end of the year. If a "General expense" account is found to be indispensable, it should be limited to the fewest possible items.

SUPPLEMENTARY NOTES

There are many supplementary notes which it is desirable to keep in the same books with the accounts. Sometimes they are written on the page of the special account to which they belong; at other times they are kept by themselves at the back of the book. Dates of "last killing frost in spring," "first killing frost in fall," "death of horse or cow," and "height of hay in mow or silage in silo at this [given] date" may be cited as valuable information that may be recorded.

There are other records that may be kept if desired, such as herd records, maps of ditches, maps of the farm showing crops grown each year, and yearly crop records showing fertilizer or manure applied and yields each year. These are not necessary to the success of the cost accounting but are useful at times and may be kept in the back of one of the books if desired.

OPENING BOOKS AT BEGINNING OF YEAR

The opening of the books is not difficult if the inventory is complete and properly prepared. First, an account is opened in the Financial Record with each class of property as shown by the inventory, such as "Real estate," "Horses," "Cows," "Machinery," "Feed and supplies," and other accounts with property, and also with each individual or firm whose name appears in the lists of "Accounts receivable" and "Accounts payable." When these accounts have been opened the inventory amounts under each head are carried to their respective accounts. All "asset" items are entered on the left-hand page of the accounts under "Charges" and the "liability" items as credits on the right-hand page. When all the entries as shown by the inventory have been made, the books are said to have been "opened." Each year, after the books have been finally closed and the results drawn off, the foregoing process is repeated for the accounts of the new year. Other accounts are afterwards opened throughout the year as items occur to be charged or credited to them.

CLOSING ACCOUNTS AT END OF YEAR

Although considerable time may be required to close a set of accounts, this part of the work usually comes at a time of the year when other work is not pressing and when weather conditions are more favorable to working indoors than out. A definite order of procedure should be adhered to in closing the accounts. The following order has proved satisfactory.

1. The first step is to take a final inventory in the same manner as the beginning of the year.

2. Itemized statements should be requested from all dealers from whom goods are regularly bought on credit. These should all be inspected and any items thereon which have not yet been entered on the books should be entered at once. Memoranda should be made of amounts due the hired men or any other persons. For instance, if a month's wages, $45, is due the hired man, labor account should be charged and a personal account with the hired man credited with this amount. After the first of the new year, when his amount is paid to the hired man, the labor account of the new year should not be charged with it, but the personal account of the hired man should receive this charge and the account be closed. All accrued income and expense of every nature that pertains to the old year and is not yet entered on the books should be handled in this manner.

3. Accounts receivable should be inspected and handled in the same manner described in step No. 2. For instance, if last month's milk check has not yet been received, the amount thereof should be secured by telephone or otherwise and the proper entries made on the books as aforesaid.

4. The "Feed" records are next figured up to date and the corresponding entries made charging the animal accounts and crediting the crop accounts, or "Feed and supplies," as the case may be.

5. The various livestock accounts should be credited with the value of any feeds charged to them at harvest, or time of purchase and not yet consumed, as they may appear in the final inventory. After the books are closed the animal accounts for the new year should be charged in like amounts in opening the books, the values of these being thus deducted from the expenses of the year in which purchased and being charged against the year in which they were consumed. This is sound accounting practice, and is known as "reversing the entries."

6. The value of pasture utilized by the animals during the year should be charged to their respective accounts and "Pasture" account credited in like amount. The rate charged for pasture should be as near as possible the price for which pasture rents in the region. Pasture account should, of course, be charged with all the expenses of pasture maintenance, as well as for the use of land in pasture as hereafter described.

7. The value of farm produce used in the home, if not entered before, should be attended to next. Included in this would be estimates of the quantities of milk, butter, eggs, potatoes, apples, etc., used by the farmer and his household. Personal account should be charged with these values and the proper animal or crop accounts credited.

8. The value of the board, produce, or other allowances furnished the farm laborers should be estimated and the amount charged against "Labor" account, crediting "Personal" account with the value of the board and the crop or other accounts for the value of the produce or other allowances.

9. The value of the unpaid farm labor done by the farmer and members of his family who are not being paid regular wages should next be estimated and entered. "Labor" account should be charged and "Personal" account credited.

10. The animals should be credited with the value of the manure produced by them during the year and the total value of manure charged against the "Manure" account. These data can be secured from the "Manure" account in the Work Record if the latter has been properly kept.

11. Estimates of proper amounts for the use of the farm buildings for the year should be made. Each crop or class of animals, the "Personal" account, and the accounts with machinery and man labor should receive a charge proportionate to its use of the buildings and the total amount so charged should be credited to the "Real estate" account. For example, charges for the use of barns on one farm were made as follows:

Distribution of annual charge for use of buildings

[Barns: Value $2,000; use for year at 10 per cent, $200]

Account to be charged	Per cent of total charge	Amount	Account to be charged	Per cent of total charge	Amount
Cows	30	$60	Oats	10	$20
Horses	20	40	Hay	20	40
Hogs	5	10			
Machinery	10	20	Total	100	200
Corn	5	10			

The use of other kinds of buildings is estimated in the same way, and when all have been so handled the total "Use of buildings" cost is found and charged to each account. As a general rule it is safe to charge 8 to 10 per cent of the current value of ordinary frame farm buildings as annual use cost or rent. Brick, stone, tile, and concrete buildings should take a somewhat lower rate.

12. The Work Record should next be reviewed and the hours and minutes of man labor charged to each account should be added up. The various totals

should then be added together and the total hours of man labor found for the year.

13. The total net cost of the "Man labor" account in the Financial Record should then be found by subtracting from the total of the charges the total of any credits. This net cost should then be divided by the total hours of man labor for the year. This gives the man-hour rate. It should be worked out in terms of cents and mills per man-hour.

14. The total hours of man labor, including chores, found against each account in the Work Record should be carried over to the charge page of the same accounts in the Financial Record. The hours should then be multiplied in each case by the man-hour rate (see step 13) and the cost in dollars and cents carried to the money columns, crediting "Man labor" account, item by item, with the same. When this has been completed the "Man labor" account will balance within a small amount. Any difference will be caused by the fact that the man-hour rate was not worked out to sufficient decimal places, as a difference in a tenth of a mill per hour where 6,000 hours are involved would make the account out of balance 60 cents. The difference, if any, may be carried to the "Loss and gain" account and entered on the charge side thereof, if the charge side of the "Man labor" account is greater, and on the credit side if the reverse be true.

15. The total hours and minutes of horse labor are next found in exactly the same manner as the man labor (step 12). Before the net cost of horse labor can be found, interest (at current rates for secured loans) must be charged (see step 20), and the final inventory value of the horses must be credited to their account. After this has been done the net cost of horse labor and the horse-hour rate are determined exactly as for man labor (step 13).

16. The total hours of horse labor against each account in the Work Record are next charged against the same accounts in the Financial Record, the values found by multiplying by the horse-hour rate and extended to the money columns of the various accounts, and the sum total credited to the "Horse account" exactly similarly to the method of handling the man labor (step 14). If the "Horse account" does not finally balance, it is handled in the same way.

17. The distribution of the annual cost of using machinery is the next step, and it is handled just as were the man and horse labor costs, with a few important exceptions. The inventory value of machinery and any machinery parts on hand at the end of the year is first credited to the "Machinery" account in the Financial Record, interest charged (see step 20), and the net cost for the year ascertained. To distribute this cost is now the problem. There is no record of machinery hours, but such a record can be dug out of the various accounts in the Work Record if desired and an hour rate worked out for each important machine and group of minor tools. This is the most accurate manner in which this cost can be distributed, but while valuable results to the student and investigator would be obtained, it is doubtful whether the practical farmer would find them useful enough to pay for the long process of figuring involved. A shorter method will now be described. It will be assumed that for every hour a horse is worked machinery is also used, and therefore each account should have charged against it the same number of machinery hours as horse hours. Machinery cost may then be distributed on the basis of horse hours. There is only one hitch here. Horse hours have been charged to "Machinery" account, and, therefore, if this basis is used machinery will have recharged against it a certain proportion of its own cost. This can be obviated by first deducting from the total horse hours the number of horse hours charged to "Machinery" account and using the remainder as the basis for distributing the entire machinery cost. This should now be done, proceeding with the distribution exactly as explained for the man-labor cost (step 14).

18. Any other accounts of convenience, as "Manure," "Feed and supplies," "General expense," etc., should now be distributed and these accounts closed.

19. All other values in the final inventory, not already credited, should be carried to their respective accounts and credited on the right-hand pages thereof.

20. Interest, based on the average inventories of each account (except "Horses" and "Machinery," which have already been charged), should be charged thereto and "Interest" account credited with the total. The rate should be the same as that already used in the two accounts specified.

21. A proper charge to crops and pasture should now be made for the use of the land and the total credited to "Real estate" account. The rate per acre should be high enough to cover interest and taxes but not so high as to make "Real estate" account show any great profit. In fact the "Real estate" account should be, if possible, made to balance by the credit for use of land. This can be done by finding the net balance of the "Real estate" account and dividing by the number of acres to be charged with rent. This will give a rate per acre which can then be handled exactly like that of "Man labor," "Horse," and "Machinery" accounts, and any small balance remaining can be handled in the same way. A point to remember is that if the final inventory value of the real estate has been increased over that at the beginning of the year to keep pace with actual advances in real estate values in the locality, such advanced values should not be used in making the above distribution, but the amount of such advance should be first taken out of the account and carried to "Loss and gain" account as a separate, distinct gain.

22. Both sides of the crop, livestock, pasture, and any other enterprise accounts should now be footed up and the lesser total subtracted from the greater to obtain the balance as shown by each account. These balances are now to be closed to "Loss and gain" account. If the charge side is greater in an account the excess represents a loss and should be carried to the "Loss and gain" account as such by entering it on the left-hand page under charges. If the credit side of an account be greater a profit has been made and should be carried accordingly to the credit side of the "Loss and gain" account. Table 2 illustrates a crop account on which a gain of $536.81 has been closed to "Loss and gain" account.

23. Both sides of the "Loss and gain" account should now be footed up, the lesser subtracted from the greater, and thus the net gain or loss for the year determined.

When all these steps have been completed the books are said to be finally "closed." It is a good plan to make up a Profit and Loss Statement for the year for convenience in further study of the year's business and to preserve, for comparison with similar statements for future years. Such a statement may be prepared in the following manner:

Statement of losses and gains, 1918

Account	Number of acres or animals	Losses	Gains	Per acre or animal	
				Loss	Gain
Cows	19		$359.11		$18.90
Hogs	3		14.82		4.94
Poultry	82		19.65		.24
Corn	10.5		26.60		2.53
Potatoes	14		536.81		38.34
Wheat	4.5		35.17		7.80
Rye	3	$19.91		$6.64	
Oats	15	3.84		.26	
Buckwheat	5	13.63		2.73	
Peas	6		35.39		5.90
Hay	40		195.65		4.89
Orchard	3		148.52		49.51
General expense		151.45			
Totals		188.83	1,371.72		
Subtracting the lesser			188.83		
Net gain on farm enterprises			1,182.89		
Personal accounts:					
Interest			388.00		
Peronal			373.85		
			1,944.74		

STUDY AND INTERPRETATION OF RESULTS

Unless studied, farm accounts are of little use to help make business more profitable in the future. It is just as important to study the different items of cost and returns in an account as to know whether or not it pays. Weather conditions, crop conditions, and market conditions, for the year, as compared with an average year, must be considered. For instance, potatoes in some year may show heavy losses on many farms because of low prices or losses by rot. By studying the potato account to find the factors of production, and considering a normal yield and price for the locality, conclusions could be reached as to whether ordinarily it would or would not be profitable to raise potatoes.

The potato account in Table 2 when studied, yields the following figures:

Total acreage	14
Total yield (bushels)	1,128
Total cost	$735.24
Total value	$1,272.05
Total profit	$536.81
Yield per acre (bushels)	80.6
Cost per acre	$52.52
Value per acre	$90.86
Profit per acre	$38.34
Man hours per acre	57
Horse hours per acre	60
Labor cost per acre	$27.10
Cost per bushel	$0.652
Value per bushel	$1.128
Profit per bushel	$0.476
Net return per hour of man labor	$0.672

Besides the satisfaction of knowing which crops or enterprises paid and how much, there are many other ways in which the accounts may be useful. They may be used to study the seasonal distribution of the labor on the farm as a whole and on certain enterprises, disclosing just where the rush seasons occur and what causes them. They may be used to compare results with neighbors, or with published cost records in newspapers and bulletins. The results of such comparisons should be to teach methods by which labor can be saved, thus cheapening production and correspondingly increasing the chances of a good profit.

By keeping cost accounts an idea of the value of labor will be gained, it is soon discovered that time represents money, and that it is as important to save one as the other. The results set forth by the accounts will often give a farmer many surprises. Sometimes it is found that the enterprises which he thinks are the best and to which he devotes most of his time do not show up so well financially as the enterprises that get little attention.

Cost accounts, carefully and consistently kept, year after year, are certain to develop both the business of farming and the farmer's power of analyzing the causes and effects involved in his operations.

XUM